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GUIDELINES FOR APPRAISAL OF MARKET VALUE (MV) FOR SOLID MINERAL INTERESTS

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TABLE OF CONTENTS

Page

PREAMBLE 1
INTRODUCTION 2
PRINCIPAL MINERAL APPRAISAL CATEGORIES 2
MINERAL MATERIAL SALES 2
Legal Citations and Specifications 2
Report Objective, Direction, and Conclusion 3
MINERAL TRESPASS 3
Legal Citations and Specifications 3
Report Objective, Direction, and Conclusion 4
CONVEYANCE 5
Legal Citations and Specifications 5
Report Objective, Direction, and Conclusion 6
EXCHANGES 7
Legal Citations and Specifications 7
Report Objective, Direction, and Conclusion 9
CONDEMNATION AND TAKING 9
Legal Citations and Specifications 9
Report Objective, Direction, and Conclusion 10
CONCEPTS FOR MARKET VALUE (MV) APPRAISAL 12
MARKET VALUE (MV) 12
Appraisal 13
Appraisal Process 13
Highest and Best Use and the Unit Rule 14
Conjecture and Speculation 17
ARM'S LENGTH TRANSACTION 18
REGULATIONS, GUIDANCE, AND STANDARD 18
MINERAL INTERESTS 19
MINERAL RIGHTS 19
MINERAL ROYALTY 19
MINERAL DEPOSITS 22
APPROACHES TO MV OF MINERAL INTERESTS 23
PRIOR SALES APPROACH 23
COMPARABLE SALES APPROACH 24

Adjustments by use of Comparative Attributes 24
Potentially Serious Problems with Adjustments 24
COST APPROACH 28
ROYALTY APPROACH 30
UASFLA Guidance 32
Royalty Rate Determination 32
General 32
Disadvantages 33
Production Verification 33
Rate Books and Area Wide Appraisals 37
Advantages 37
Disadvantages 37
INCOME APPROACH FOR MINERAL RESERVES 38
BASIC CONCEPTS 38
USE OF A DCF MODEL FOR ANALYSIS 40
TECHNICAL CONSIDERATIONS FOR DCF MODEL 43
Land Status, Use, and Access 43
Physical Features and Improvements 45
Geology and Mineral Deposits 45
Reserves 45
Waste Factors and Recoverable Material 46
MARKETABLITY CONSIDERATIONS FOR DCF MODEL 47
Market Area 49
Selling Price 49
Product Specifications 52
Market History 52
Market Supply and Demand 52
Market Entry 52
Extraction Rates, and Remaining Economic Life 53
COMPONENTS FOR A DCF MODEL 54
Cash Flow (CF) 54
Discounted Cash Flow (DCF) 54
Discount Rate of Return (DR) 54
Internal Rate of Return (IRR) 57
Inflation and Inflation Rate (IR) 57
Escalation and Escalation Rate (ER) 57
Risk and Risk Factor (R,RF) 59
Net Present Value (NPV) 60
Costs and Salvage Value 60

Operating Costs (OC) 60
Capital Costs(CC) 61
Working Capital Costs (WCC) 61
Depreciable Capital Costs (DCC) 62
Non-depreciable Capital Costs (NDC) 62
Exploration Costs (EC) 62
Development Costs (DC) 63
Salvage Value (SV) 63
Mineral Tax Framework and Calculation 63
Federal Tax – General 63
Federal Tax – Calculation 63
Pertinent Tax Law Changes Since 1991 64
Basic Tax Definitions 65
Depreciation (DP) 66
Depletion (DPL) 68
State Taxation Methods 69
State and Federal Income Taxes-Computations 70
Individual Income Tax 70
Summary Considerations 70
Some Special Considerations 71
Conclusions 72
ABBREVIATED APPROACHES TO MV FOR MINERALS .. 72
MINERAL APPRAISAL REPORTS 74
GENERAL 74
REPORT CHECKS 74
REPORT GOALS AND STANDARDS 76
REPORT FORMAT 78
REPORT REVIEW 78
Introduction 78
Goals 78
Technical Review and Editing 86
Technical Reviewer/Appraiser Relationship 86
Review Techniques 86
General 86
Process 87
Specific Instructions 87
RESOLUTION OF DISPUTES REGARDING MV 88
E FACTORS FOR APPRAISAL PRACTICE 89

SELECTED REFERENCES.....89

TABLES

T-1 Comparative Mineral Appraisal Attributes For Mineral Interest Sales.....25

T-2 Description if Attributes for Mineral Interest Sales.....26-27

T-3 Comparative Information for the Competitive Sale of Sand and Gravel from the Indian Creek Sit.....34

T-4 Comparative Sales Data for the Competitive Sale of Sand and Gravel from the Indian Creek Site.....35

T-5 Haul Truck Tally Sheet.....36

T-6 Discounted Cash Flow Model.....44

T-7 Annual Gold Prices with Percentage Change.....50

T-8 F.O.B. Price List.....51

T-9 Mineral Report Format and Sections.....79-82

T-10 Mineral Report Table of Contents Format and Sections (Royalty Rate).....83-85

Attachments

A-1 Guidelines for Examination of Aggregate Deposits.....4 pages.

A-2 A Guide for Reporting Exploration Information, Mineral Resources, and Mineral Reserves.....17 pages.

PREAMBLE

The passage of Financial Institution Reform, Recovery and Enforcement Act (FIRREA) of 1989, and the requirements of federal, state and local licensing boards all require the adherence to the Uniform Standards of Professional Appraisal Practice (USPAP). The mineral appraisal system, as practiced by the BLM, folds the mineral estate appraisal into the surface estate's appraisal report as a requirement of the Federal Land Protection and Management Act, 1976. Therefore, some basic understanding of real estate appraisal methods and procedures are necessary in order to complete the requirements of the BLM.

The valuation of mineral properties is a specialized and complex subject. The appraiser must have the necessary knowledge, training, and experience in order to understand and apply the proper techniques and methodologies established for the determination of the market value of a subject property (see USPAP Competency Rule, 2002, p.10).

Mineral appraisal involves such topics as mineral rights, royalty determination and assessment, and mineral deposit evaluation. This work is highly specialized, requiring training and experience in the geologic conditions for deposit recognition, extraction and recovery processes, and market recognition and evaluation. Also required are training and experience in the economics of natural resource extraction, including evaluation methods such as Discount Cash Flow analysis, tax structure and tax consequences. Other evaluation methodologies used are the prior sale and comparable sale technique. These approaches are somewhat limited in usage as most deposits have no prior sales record and are rather unique (grade, tonnage, metallurgy, recovery, etc.). It is most difficult to find recent sales of similar deposits.

Another aspect for the development of the appraisal is the highest and best use analysis. Land usage has many purposes. Value benefits obtained from the land can vary depending on individual uses. The present worth of anticipated future income on the land use will result from the analysis of highest and best use. This concept is defined as that use, which at the time of the appraisal is most likely to produce the highest value, provided the use is physically possible, legally permissible, and financially feasible.

INTRODUCTION

Appraisals for mineral concerns by the Federal Government almost always fall into one of five categories. These categories are: Mineral Material Sales, Mineral Trespass, Mineral Conveyance, Condemnation and Taking, and Exchanges. This Guideline has discussions of the techniques necessary to make a mineral appraisal in each of the five categories. Below are brief discussions, and references for detailed information for each of the categories.

PRINCIPAL MINERAL APPRAISAL CATEGORIES

MINERAL MATERIAL SALES

Legal Citations and Specifications

30 U.S.C. 601 et seq., 43 U.S.C. 1732, 1734, 31 U.S.C. 9701, 43 CFR 3600

The Materials Act of July 31, 1947, as amended by Public Law 167 (Multiple Use Mining Act) of July 23, 1955 (30 USC 601), authorized the disposal or sale of certain types of mineral materials on public lands in the United States. Disposal is through competitive or noncompetitive contracts or free-use permits rather than by mining claim location under the Mining Laws. Collectively, these salable minerals include, but are not limited to common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. A lengthy definition of common variety mineral materials is given at 43 CFR 3711.1(b).

Conditions and procedures for sales or disposals on BLM-administered land are found in Federal regulations at 43 CFR 3600, BLM Manuals 3600 Disposal, 3630 Appraisal, and BLM Handbooks H-3600-1 Disposal and H-3630-1 Appraisal. One new condition is permission by the BLM to dispose of mineral materials from unpatented mining claims under certain situations. At 43 CFR 3601.14 it is stated:

A) BLM may dispose of mineral materials from unpatented mining claims if disposal does not endanger or materially interfere with prospecting, mining, or processing operations, or uses reasonably incident thereto.

B) BLM will ask a mining claimant for a waiver before disposing of mineral materials from a claim. If the mining claimant refuses to sign a waiver, BLM will make sure that disposal of the

mineral materials will not be detrimental to the public interest. We also will consult with the Solicitor's Office, if necessary, before proceeding with the disposal.

In BLM Handbook H-3600-1 (disposal) Chapter 10 A-B a detailed discussion is made of disposal from unpatented mining claims, and from mine tailings, overburden stockpiles, and chemically treated material.

Report Objective, Direction, and Conclusion

While the key word used above is sale, the key appraisal word should be royalty. Therefore, if the BLM or USFS "sells" material, it is sold by means of a reasonable royalty rate with any appropriate upfront payments. If another Department of Interior Agency such as the Bureau of Reclamation (BOR) offers a lease, it is just that – a lease. Royalty and other conditional payments are negotiated independently with the BOR and a private party. The laws and regulations mentioned above do not apply.

MINERAL TRESPASS

Legal Citations and Specifications

43 CFR 9230, R.S. 2478, 43 U.S.C. 1201, 18 U.S.C 1851; 30 U.S.C 201 (b)(4)

The extraction, severance, injury, or removal of timber or other vegetative resources or mineral materials from public lands under the jurisdiction of the Department of the Interior, except when authorized by law and the regulations of the department, is an act of trespass. Trespassers will be liable in damages to the United States, and will be subject to prosecution for such unlawful acts (See 43 CFR 9239.0-7).

There are two types of mineral trespass: willful and innocent. A willful trespass is one done deliberately, recklessly, intentionally, or willfully with knowledge that the action was in violation of law. An innocent trespass is one where the taking of material was done inadvertently, innocently, and in good faith under a genuinely mistaken belief of a right to extract the material. (See BLM Manual 9235.05 and Handbook H-9235-1, Chap.1 B (3,4).

Further- "the test to determine whether one was a willful or an innocent trespasser is not his violation of the law in the light of the maxim that every man knows the law, but honest belief, and his actual intention at the time he committed the trespass; and neither a justification of the acts nor any other complete defense to them is essential to the proof that he who committed them was not a willful trespasser" – U.S. v. Homestake Mining Co., 117 F. 481 (18th Cir., 1902).

According to 43 CFR 9239.5-1, the measure of damages for ores (minerals) is the same as in the case of coal except where there is State law governing such trespass. The determination of payment in coal trespass is as follows: for innocent trespass payment must be made for the value of the coal at the time of conversion without deduction for labor bestowed or expense incurred in removing and marketing the coal. See also 43 CFR 9239.5-3(a)(1)(2).

Public Law 89-505, No. 1, July 18, 1966, (80 Stat 305) gives a limitation of time during which the Government may institute a suit to collect a measure of damage. Suits to recover a measure of damage for a mineral trespass on public lands are barred unless the Government files a complaint in court within 6 years after the mineral trespass. Also, the pendence of a contest proceeding in the Department of Interior does not suspend or interrupt the running of the statutory 6-year period.

Report Objective, Direction, and Conclusion

As California has no State law governing willful trespass, the appraiser should use the full value of the minerals at the date of conversion. Therefore, the current f.o.b. selling price is assessed for all prior sales of material. The use of a current date is based on the assumption that if the minerals were not extracted, they would be available for extraction in a current a market at a current price (see M.L. Peterson, 151 IBLA 379(2000).

However there is a State law governing innocent trespass. In U.S v. Marin Rock and Asphalt Co., 296 F. Supp. 1213 (1969), the court ruled that (1) either a reasonable royalty rate, or (2) the value of extracted minerals less costs of production are the appropriate measure of damages to be used by a plaintiff suing a good-faith (innocent) trespasser. For our purposes, a reasonable royalty rate as of the appropriate date is used in determining the measure of damages for innocent trespass. The second method is not used because of the difficulty of obtaining needed input data. See also Curtis Sand and Gravel

Co. Estate of Claire Schweitzer, 95 IBLA 144 (1987) for further legal detail.

CONVEYANCE

Legal Citations and Specifications

43 CFR 2720, 43 U.S.C. 1719(b), 43 U.S.C. 1740

The objective is to allow consolidation of surface and subsurface or mineral ownership where there are no known mineral values or in those instances where the reservation interferes with or precludes appropriate non-mineral development and such development is a more beneficial use of the land than the mineral development (43 CFR 2720.0-2).

Known mineral values means mineral rights in lands containing geologic formations that are valuable in the monetary sense for exploring, developing, or producing natural mineral deposits. The presence of such mineral deposits with potential for mineral development may be known because of previous exploration, or may be inferred based on geologic information (43-CFR 2720.0-5)(b).

The Bureau of Land Management may convey a federally owned mineral interest only when the authorized officer determines that it has no known mineral value, or that the mineral reservation is interfering with or precluding appropriate non-mineral development of the lands and that non-mineral development is a more beneficial use than mineral development. Allegation, hypothesis, or speculation that such conditions could or may exist at some future time shall not be sufficient basis for conveyance. Failure to establish by convincing factual evidence that the requisite conditions of interference or preclusion presently exist, and that non-mineral development is a more beneficial use, shall result in the rejection of an application (43-CFR 2720.0.6). Some helpful guidance actions for mineral conveyance are found in Wayne D. Klump, et al., 123 IBLA 51, (1992).

An exploration program under a BLM approved plan of operations at the applicant's expense, may be needed to determine known mineral values and/or fair market value of the mineral interests. The authorized officer will rely upon reports prepared or reviewed by the BLM to determine the above plans or values as well as the costs to be incurred (see 43 CFR 2720.1-3)

If an exploration program is needed the applicant must obtain the consent of the authorized officer. The program is to be conducted only

under a plan of operations approved by the authorized officer and deposited with the authorized officer an amount of money the authorized officer estimates is needed to cover administrative costs of processing, including, but not limited to, costs of evaluating existing data and data submitted from an approved exploratory program to determine the fair market value of the mineral interests to be conveyed and preparing and issuing the documents of conveyance.

The authorized officer, in reaching a determination as to whether there are any known mineral values in the land and if so, the estimated costs of an exploratory program, if one is needed, will rely upon reports on minerals prepared by or reviewed and approved by the Bureau of Land Management (43 CFR 2720.1-3(2)).

An exploration plan may not be required under the following conditions given at 43 CFR 2720.2.

(a) In instances where available data indicate that there is no known mineral values in the land covered by the application, an exploratory program shall not be required.

(b) The authorized officer will not require an exploratory program to as certain the presence of mineral values where the authorized officer determines that a reasonable person would not make exploration expenditures with expectations of deriving economic gain from the mineral production.

(c) The authorized officer will not require an exploratory program if the authorized officer determines that, for the mineral interests covered by the application, sufficient information is available to determine their fair market value.

If the authorized officer determines that all requirements for conveyance have been met by the applicant, a notice will be issued to him. The notice must require the applicant to pay both the fair market value of the federal mineral interests and the remaining administrative costs owed within 90 days after the date the authorized officer mails the notice (43 CFR 2720.3).

Report Objective, Direction, and Conclusion

A determination of known mineral value and a statement about interference must be made. If an exploration plan is deemed necessary then the type of exploration and approximate costs thereof must be

given. Depending on the situation an appraisal of market value of any mineral deposit may have to be made.

EXCHANGES

Legal Citations and Specifications

43 CFR 2200, 43 U.S.C. 1716, 1740

The objective is to encourage and expedite the exchange of Federal lands for non-Federal lands found to be in the public interest, in accordance with applicable statutory policies, standards, and requirements (see 43 CFR 2200.0-2).

Exchange between Federal and non- Federal parties are discretionary, and voluntary, and may be completed only after a determination is made that the public interest will be well served, and the lands involved are of equal or nearly equal value (see 43 CFR 2201.06 and 2201.6). Generally, parties to an exchange will bear their own costs (see CFR 2201.1-3).

Value of the private and Federal property in exchanges means market value (fair market value) for interests including minerals. Concerning mineral interests, it is usually the mineral deposit (owner's interest) that should be appraised, not any royalty interest. As defined at 43 CFR 2200.0-5(n), market value means the most probable price in cash, or terms equivalent to cash, that lands or interests in lands should bring in a competitive and open market under all conditions requisite to a fair sale, where the buyer and seller each acts prudently and knowledgeable, and the price is not affected by undue influence.

Exchanges are to be of equal value as described at 43 CFR 2200.0-6(c) as:

> Equal value exchanges. Except as provided in 2201.5 of this part, lands or interests to be exchanged shall be of equal value or equalized in accordance with the methods set forth in 2201.6 of this part. An exchange of lands or interests shall be based on market value as determined by the Secretary through appraisal(s), through bargaining based on appraisal(s), or through arbitration.

Value can be equalized under certain conditions given below (43 CFR 2201.6(c) as:

(a) To equalize the agreed upon values of the Federal and non-Federal lands involved in an exchange, either with or without adjustments of relative values as compensation for various costs, the partied to an exchange may agree:

(1.) To modify the exchange proposal by adding or excluding lands; and/or

(2.) To use cash equalization after making all reasonable efforts to equalize values by adding or excluding lands.

(b) The combined amount of any cash equalization payment/or the amount of adjustments agreed to, as compensation for costs under 2201.1-3 of this part may not exceed 25 percent of the Federal lands to be conveyed.

(c) The parties may agree to waive a cash equalization payment if the amount to be waived does not exceed 3 percent of the value of the lands being exchanged out of Federal ownership or $15,000, which ever is less. This provision shall not be applied to exchanges where the value differential is in excess of $15,000.

(d) A cash equalization payment may be waived only after the authorized officer determines in writing how the waiver will expedite the exchange and why the waiver will better serve the public interest.

(a) In estimating market value the appraiser shall (43 CFR 2201.3-2):

(1) Determine the highest and best use of the property to be appraised;

(2) Estimate the value of the lands and interests as if in private ownership and available for sale in the open market;

(3) Include historic, wildlife, recreation, wilderness, scenic, cultural, or other resource values, or amenities that are reflected in prices paid for similar properties in the competitive market;

(4) Consider the contributory value of any interests in land such as minerals, water rights, or timber to the extent they are consistent with the highest and best use of the property; and

(5) Estimate separately, if stipulated in the agreement to initiate in accordance with 2201.1-1 of this part, the value of each property optioned or acquired from multiple ownerships by the non-Federal party for

purposes of exchange, pursuant to 2201.1-1 of this part. In this case, the appraiser shall estimate the value of the Federal and non-Federal properties in a similar manner.

(b) In estimating market value, the appraiser may not independently add the separate values of the fractional interests to be conveyed, unless market evidence indicates the following:

(6) The various interests contribute their full value (pro rata) to the value of the whole; and

(7) The valuation is compatible with the highest and best use of the property.

(c) In the absence of current market information reliably supporting value, the authorized officer may use other acceptable and commonly recognized methods to determine market value.

Appraiser qualifications, appraisal report standards, and appraisal report review are given at CFR 2201.3-1, 3-3 and 3-4, respectively.

Report Objective, Direction, and Conclusion

Assuming that mineral development is the highest and best use a mineral appraisal for market value of the mineral deposit should be made.

CONDEMNATION AND TAKING

Legal Citations and Specifications

In the Fifth Amendment to the U.S. Constitution, it is stated that private property shall not be taken for public use without just compensation. A taking occurs whenever there is a substantial interference with the free use and enjoyment of a property. Just compensation usually means that property owners should be put into as good a monetary position as they would have been if the taking did not happen.

Regulatory taking of property (inverse condemnation) can be done, but the effect of regulatory restriction on the use of that property certainly can result in a taking of property rights. Therefore, if the government condemns property rights, or if a taking occurs by regulation and goes to far, just compensation should be paid (Pennsylvania Coal Co. v. Mahon, 260 U.S. 393,415 S. Ct. 158, 67 L. Ed. 322, 1922).

Even though the government has the power (Eminent Domain) to take property for public use without the consent or acceptance of the owner, an agency will usually make an upfront money offer for the property in question. If a resolution is not achieved with the property owner, the government will condemn the property and began court action. Nevertheless, even with Eminent Domain the government must pay just compensation for the property.

Report Objective, Direction, and Conclusion

In regards to minerals, just compensation usually translates into MV of the mineral interests. Generally, it is the MV of the whole property as enhanced by economic minerals that has to be determined, and at the time of taking.

A question arises as to what mineral interest is to be appraised- royalty interest or the operator's interest (value of mineral deposit). Where a taking has occurred and a lessor (property owner) is receiving royalty payments from a lessee, the royalty interest has been used. Where the property owner is mining a deposit and no lessee exists, the matter is not so clear. While royalty value has been used, the determination of the operator's money interest is not precluded (value of reserves and any facilities).

For guidance in MV determination of mineral interests (dolomite deposit) see Jack S. Foster, et al. v. The United States 2 Cl. Ct. 426(1983) aff'd 746 F. 2d 1491 (Fed. Cir. 1984), cert. denied, 471 U.S. 1053 (1985) – especially pages 426-427, and 448-449. Some of the important items listed on pages 426 and 427 are given below:

2. Eminent Domain – Guiding principle of just compensation is to reimburse the owner for the property that was taken: "just compensation" means the full monetary equivalent of that property; owner is to be put in the same position, from a monetary standpoint, as he would have been without the taking; he is to be made whole but he is not entitled to more.

4. Eminent Domain – The burden of establishing the value of the property taken rests upon the claimant.

5. Eminent Domain – There is no compensation for frustrated contracts or for loss of future income; sovereign must pay only for what it takes, not for opportunities, which the owner loses.

6. Eminent Domain – Essential question in an eminent domain proceeding is always what has the owner lost, with the owner indemnity measured in different ways dependant on the circumstances of the case.

7. Eminent Domain – Just compensation invokes the equitable powers of the court and there is wide latitude of judicial discretion to include or exclude particular elements of damage.

8. Eminent Domain – In most cases, question of just compensation can be answered by ascertainment of the market value, i.e., what willing buyer would pay in cash to a willing seller.

9. Eminent Domain – Fair market value is not an absolute standard, nor is it the exclusive method of valuation of the taken property, where comparable sales data is lacking, resort may be had to the best available data which even though somewhat uncertain, is sufficient to produce a value on a reasonably informed basis.

10. Eminent Domain – Mere physical presence of a mineral on land is not enough to establish a right to just compensation; there must be showing of a market which the mineral from that land could reasonably supply.

11. Eminent Domain – Evidence of value of the taken property is largely a matter of opinion and some speculation is inherent in the ascertainment of the value of any underground resources, such as minerals, oil, or gas.

12. Eminent Domain – Traditional and most frequently employed technique for obtaining fair market value is the market data or comparable sales approach; other techniques include capitalization of income, sometimes referred to as discounted cash flow or present worth of future income, or the cost approach which uses depreciated replacement cost as the value of the asset.

13. Evidence – Elements of sales of distant properties, even those with different mineral content, may be comparable in an economic or market sense for purposes of determining just compensation for taking of mineral interests when due allowance is made for variables.

15. Eminent Domain – Direct capitalization of net income is an appropriate method for valuing the taken property only when actual income from the property can be established in a continuing ongoing business; it is of little value where the realization of an opportunity for income was not even begun as the date of taking.

16. Mines and Minerals – "Royalty Interest" is an interest of a passive landowner-lessor or of an inactive lessee; "operators interest" is the interest of a person with the right, the capital, and the ability to

develop, produce, and sell the mineral; both are property rights, which can be bought and sold.

18. Eminent Domain – Capitalization of income approach to determine the value of taken property requires the future income stream to be discounted in order to obtain a present value as if the date of taking.

20. Eminent Domain – In order to produce full equivalent of property taken, just compensation includes interest on the market value of mineral rights taken, computed at simple interest rates from the time of taking to the time of payment.

CONCEPTS FOR MARKET VALUE (MV) APPRAISAL

MARKET VALUE (MV)

According to the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA-2000 ed.), p. 13 the following definition of MV must be used:

> Market Value is the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would have sold on the effective date of the appraisal, after a reasonable exposure time on the open competitive market, from a willing and reasonably knowledgeable seller to a willing and reasonably knowledgeable buyer, with neither acting under any compulsion to buy or sell, giving due consideration to all available economic uses of the property at the time of the appraisal.

Also, on p. 13, some warning notes are given:

> No other definition of market value for purposes of appraisals made under these Standards is acceptable, unless otherwise required by a specific and cited federal law or regulation. Contrary to Uniform Standards of Professional Appraisal Practice, 2000 ed. (USPAP) Standards Rule 1-2(c), this definition of market value does not call for the estimate of value to be linked to a specific exposure time estimate, but merely that the property be exposed on the open market for a reasonable length of time, given the character of the property and its market. Therefore, the appraiser's estimate of market value shall

> not be linked to a specific exposure time when conducting appraisals for federal land acquisition purposes under these Standards .

The adding of adjectives like fair or cash to market value does not change the meaning of market value for federal land acquisition purposes (United States v. Miller, 317 U.S. 369, 374 (1943)).

Appraisal

An appraisal is an opinion of value at a given time. It is supported by a logical analysis of factual data based on the knowledge, skill, experience, and ethics of the one making the appraisal. Accompanying an appraisal there should be statements about any assumptions and limiting conditions, the scope and purpose of the appraisal, and a summary of any appraisal problems.

Appraisal Process

The mineral appraisal process involves a systematic, orderly, and logical method of collecting, analyzing, and processing technical and economic data to make a proper determination of the MV of specific mineral interests. If adequate data is not made available to the appraiser the resulting appraisal may be flawed.

An appraiser must make a complete and detailed inspection of whatever mineral interest is involved with full consideration of applicable legal principles, laws, and regulations. Results from the appraisal process depend on the diligence of the appraiser. Carefulness and thoroughness are critical concepts to be used in the appraisal process. Ultimately, a proper appraisal is the product of the knowledge, skill, experience, and ethics of the appraiser. The valuation methods and the assumptions made therein used by the appraiser must be appropriate to the type of appraisal made.

Conjectural and speculative considerations can be prevalent in the mineral field and should not be used in the appraisal process. Transactions negotiated by unrelated parties, each acting in their own best interest (arm's length) is an important element to be considered in the process. A caution is set out on B-9, p. 45 in the UASFLA (2000 ed.):

> In seeking to determine market value, there should be taken into account all considerations that might fairly be brought forward and reasonably be given substantial weight in bargaining between buyer and seller. However,

> the Supreme Court has stated that: "Elements affecting value that depend upon events or combinations of occurrences which, while within the realm of possibility, are not fairly shown to be reasonably probable, should be excluded from consideration." See Olson v. United States, 292 U.S. 246, 257 (1934); also discussion in United States v. 320.0 Acres of Land, 605 F.2d 762, 814-820 (5th Cir., 1979).

For Federal land acquisitions, certain specific directions are given on page 7 of UASFLA (2000 ed.). They are as follows:

> It should be recognized that the government's needs for private property for public purposes are quite varied and have a tendency to create unique valuation problems. These Standards do not cover all of the valuation problems that might be encountered in the appraisal of property for government acquisition, and so should not be considered as rigid rules which must be applied in every instance.
>
> The appraiser may sometimes encounter unique appraisal problems that require modification of the appraisal process and the appraisal report to ensure that the specific appraisal problem is adequately addressed and that the appraiser's final conclusion of value is accurate, and has been developed in accordance with controlling federal law. With written agency concurrence, appraisers should feel free to deviate from the Standards in those unique cases that require deviation to properly solve appraisal problems so long as such deviation is in accord with federal law and can be adequately justified. Such justification must be included in the appraisal report.

Highest and Best Use and the Unit Rule

Land can be used for many purposes. Value benefits obtained from the land can vary depending upon individual uses, and the present worth of anticipated future income depends on the use the land is put to. The highest and best use means the most profitable use for which the property is adaptable and needed or likely to be needed in the reasonably near future (Olson v. United States, 292 U.S. 246, 255 (1934)). In short, any highest and best use of a property must be physically possible, legally permissible, financially feasible, and, of course, result in the highest value for that use. To the extent possible, the highest and best use must be determined before the appraisal. Sometimes this

determination may be difficult until appraisals are made for different uses, particularly so in the case of real estate vs. mineral use.

Two important concepts regarding highest and best use for government considerations are given on p. 35 of UASFLA (2000 ed.) They are as follows:

> The use to which the government will put the property after it has been acquired is, as a general rule, an improper highest and best use. It is the value of the land acquired which is to be estimated, not the value of the land to the government. If it is solely the government's need that creates a market for the land, this special need must be excluded from consideration by the appraiser. Only on the rare occasion that a private demand for the land exists, for the same use for which it is being acquired by the government, is it proper for the appraiser to conclude that the highest and best use of the property is that use for which it is being acquired by the government (United States v. Cors, 337 U.S. 325, 333 (1949); United States v 320.0 Acres of Land, 605 F.2d 762, 811 n. 107 (5th Cir. 1979); United States v. 46,672.96 Acres of Land, 521 F.2d 13, 15, 16 (10th Cir. 1975); J.A. Tobin Construction Co. v. United States, 343 F.2d 422, 423 (10th Cir. 1965), cert denied, 382 U.S. 830; United States v. 158.76 Acres of Land 298 F.2d 559, 560 (2nd Cir. 1962); United States v. Chandler-Dunbar Co., 229 U.S. 53, 80-81 (1913); United States v. 320.0 Acres of Land, 605 F.2d 762, 783 n.26, 811 n.107 (5th Cir. 1979).

And, the appraiser's estimate of highest and best use must be an economic use. A non-economic highest and best use, such as conservation, natural lands, preservation, or any use that requires the property to be withheld from economic production in perpetuity, is not a valid use upon which to estimate market value. Therefore, any appraisal based on such a non-economical highest and best use will not be approved for federal law acquisitions purposes. Similarly, an appraiser's use of any definition of highest and best use that incorporates non-economic considerations (e.g., value to the public, value to the government, or community development goals) will subject the appraiser's report to disapproval for use for federal land acquisition purposes.

A closely allied concept here is the so-called unit rule. This is a market value concept and generally is applied for federal land acquisitions. There are two parts to the unit rule. The first part of the rule is that property must be valued as a whole rather than by the sum of various interests, like lessor and lessee. This aspect is put forth because it is property, not individual interests that are being acquired, and therefore the property must be valued as a whole (United States v. Dunnington, 146 U.S. 338, 351 (1892); Bogart v. United States, 169 F.2d 210, 213 (10th Cir. 1948); Nebraska v. United States, 164 F.2d 866, 868 (8th Cir. 1947), cert, denied 334 U.S. 815; United States v. 25.936 Acres of Land, 153 F.2d 277, 279 (3rd Cir. 1946); Meadows v. United States, 144 F.2d 751, 753 (4th Cir. 1944), cert, denied, 358 U.S. 921).

The second part of the rule requires that different possible uses on a land parcel are not supposed to be valued separately and then added together for a total value ot arrive at a cumulative appraisal. It is not always wrong for an appraiser to consider different uses if it aids the estimation of the property as a whole. See (United States v. 91.90 Acres of Land, 586 F.2d 79, 87 (8th Cir. 1978); cert, denied, 441 U.S. 944 (1979); United States v. 6.24 Acres of Land, 99 F.3d 1140 (6th Cir. 1996); Morton Butler Timber Co. v. United States, 91 F.2d 884, 888 (6th Cir. 1937); United States v. 25.936 Acres of Land, 153 F.2d 277, 279 (3rd Cir. 1946); Unites States v. W.R. Carroll, 304 F.2d 300, 306 (4th Cir. 1962); United States v. Jaramillo, 190 F.2 d 300, 302 (10th Cir. 1951); United States v. 8.41 Acres of Land, 680 F.2d 388, 395 (5th Cir. 1982).

Also, see Standards Rule 1-4(e), USPAP, 2000 ed., p.19 which is important and states:

> **An appraiser must analyze the effect on value, if any, of the assemblage of the various estates or component parts of a property and refrain from valuing the whole solely by adding together the individual values of the various estates or component parts.**
>
> Comment: Although the value of the whole may be equal to the sum of the separate estates or parts, it also may be greater than or less than the sum of such estates or parts. Therefore, the value of the whole must be tested by reference to appropriate data and supported by an appropriate analysis of such data.
>
> A similar procedure must be followed when the value of the whole has been established and the appraiser seeks to

value a part. The value of any such part must be tested by reference to appropriate data and supported by an appropriate analysis of such data.

For real estate interests, one valuable use may well preclude another (shopping center vs. golf course, and so forth) and the appraisal should be for the more profitable use. However, when it comes to mineral interests vs. other interests, reason must be used. Say a real estate interest appears to have a higher value than the mineral interest, but does not preclude mineral development. It does not automatically mean that the mineral interest should not be considered. However, the parcel must be physically capable of producing minerals, and there must be a legal right to do so. Moreover, there should be a reasonable possibility of selling the mineral in the market place, in the reasonably near future. This example is uncommon, but indicates that mineral interests could be developed along with, or soon after, other interests and should not automatically be excluded from appraisal considerations.

In regard to minerals specifically, remember:

- They must exist (physical possibility).
- Legal permission to extract them must be obtained or it is clear that permission could be obtained (legal permissibility).
- A market for the minerals in question must exist (financial feasibility).
- They are, or can be, produced economically (financial feasibility).
- Their extraction must be the most profitable venture relative to other uses over a reasonable period of time unless concurrent uses are possible (maximum profitability).
- Reserves cannot be multiplied by the market value per unit of reserve to obtain an appraised value (UASFLA, p. 54, 2000 ed).

Conjecture and Speculation

The following text is taken from Uniform Appraisal Standards For Federal Land Acquisitions, 2000, p.45

> B-9. Conjectural and speculative evidence: In seeking to determine market value, there should be taken into account all consideration that fairly might be brought forward and reasonably be given substantial weight in such bargaining between buyer and seller. However the Supreme Court has stated, " Elements affecting value that depends upon events or combinations of occurrences which, while within the realm of possibility, are not fairly

shown to be reasonable, should be excluded from consideration." See Olson vs. United States, 292 U.S. 246, 257 (1934); See also discussion in United States vs. 320.0 Acres of Land, 605 F. 2d 762, 814-820 (5th Cir. 1979)
These considerations are prevalent in the minerals field and much harder to discern as speculative than for other interest. It takes strong technical knowledge to analyze a proposal for a mining development and evaluate the reasonable probability for production.

ARM'S LENGTH TRANSACTION

A transaction negotiated by unrelated parties, acting in their own best interest is considered to be at arm's length.

SUMMARY OF REGULATIONS, GUIDANCE, AND STANDARDS

Legal and regulatory guidance (including fees, rentals, and royalties) regarding Federal lands is found in Title 43, Code of Federal Regulations, under Minerals Management. Specifically:

2130 Acquisition of Lands or Interests in Lands by Purchase or Condemnation
2200 Exchanges
2720 Conveyance of Federally – Owned Mineral Interests
3000 Minerals Management
3400 Coal Management
3500 Solid Minerals Other than Coal
3600 Mineral Materials(BLM manual 3600 and Handbook H-3600-1)
3700 Multiple Use; Mining
3800 Mining Claims Under the General Mining Laws

Appraisal guidance and standards are also found in:

Uniform Appraisal Standards For Federal Land Acquisitions (UASFLA), 2000, Interagency Land Acquisition Conference, Washington, DC, appraisal Institute in cooperation with the U.S. Dept. of Justice, 129 p.

Uniform Standards of Professional Appraisal Practice, (USPAP), 2002, 249 P, the Appraisal Foundation, Appraisal Standards Board, updated annually.

MINERAL INTERESTS

MINERAL RIGHTS

Mineral rights may consist of ownership of mining claims, mill sites, leases, mineral material sales contracts, prospecting permits, private ownership of a privilege to extract minerals, and nongovernmental leases and contracts. These rights can have a MV and allow a party to enter a parcel of land to explore and/or develop, remove, and sell (produce) mineral products. Fees, rents, bonus bids and royalty privileges are examples of governmental rights that can have a MV attached to them.

MV of mineral rights can be determined as an entity, but usually they are considered in relation with mineral royalty or a mineral deposit MV. An MV determined independently of the mineral deposit (royalty) does not reflect the total MV of all mineral interests for a mineral deposit. A MV for a federal lease can be determined by making a DCF analysis using the rent payments for the term of the lease. Also a MV for a royalty interest may be determined for a federal property where the mineral rights are such that only a mineral material a sale may be made. In this case the government has exclusive rights, and the property is not as though it were on the open market. Any bonus bids must also be included in the analysis.

The California State Assessors' Handbook, Section 560- Assessment of Mining Properties (3-97) on page 6-9 has the following statement regarding unpatented mining claims:

> One valuation method the Board of Equalization's Staff has recommended over years is the capitalization of the recording fees and rental fees (or assessment work) required by the federal government. These represent income to the land and are an indication of the minimum value that the claimant perceives the property to be worth; otherwise, it would not be retained. The rental fee or value of assessment work should be capitalized into perpetuity, since there is no time limit on how long a claim can be held.

MINERAL ROYALTY

Sovereign ownership of land and minerals is typified by the Roman occupations and conquests. Minerals could be extracted by a selected few through permission of the emperor and/or his designee by payments

of rent for the privilege. With passage of time in Europe, the concept that a King, Crown, or Sovereign (Royalty) owned all entities continued until the Renaissance period about the 15th century. Free miners then won a right to discover and claim mineral deposits. However, part of their production had to be paid to a Royalty. Therefore, royalty was a tax on mineral production paid to a Crown or the Church (Borne, 1989, p.1). Today, a royalty interest is one of an owner (lessor), and an operator's interest is that of one with a right, money, and the wherewithal to mine and sell a mineral. Both these interests are property and can be bought and sold.

Therefore, royalty means a payment to the owner of a mineral property as interest for the privilege of producing a mineral commodity from the owner's land. Also, there can be an up-front bonus type payment for this privilege. These payments and other stipulations are put forth in a written lease agreement. The privilege, without any bonus payment, is really reflected as part of the value of the extracted minerals sold and paid in money by a lessee to a lessor under agreed upon terms. Because of this concept, the lessee is entitled to depletion credit on his portion of the sold minerals and must pay income taxes on this royalty income. Lease agreements including royalty income can be sold and have a MV. An overriding royalty is a retained royalty by a lessee when the property is subleased.

A value for a mineral royalty is often determined and put forth as a MV of all mineral interests for a mineral deposit. Although easier to determine than a mineral deposit MV, royalty MV does not reflect the total MV of all mineral interests for a mineral deposit.

Royalty payments are generally made in two ways with several stipulations. For example:

- Cents or dollars per unit mined or sold, such as ounces, pounds, tons, or cubic yards at FOB (free on board) mine site price. Units may be measured across a scale, in place, by truck load lot, or by refined product by appropriate weight.

- Percentage payments based on gross value of the units processed and sold, say 2% of sales value of whatever units such as a Net Smelter Return (NSR) for gold or base metals. This way is called ad valorem (at value) because it is a value based royalty.

Certain terms regarding royalty are here briefly defined. A more complete list is given by Harben, January 2003, p. 69, and March 2003, p. 81.

Advance Royalty – Royalty that must be paid in advance on a fixed or anticipated production, whether produced materials were sold or not. Possibly, royalty paid over actual or no sales of products could be credited on future production depending on lease agreement terms.

Production Royalty – Royalty paid on actual production and/or sales of products. Note: Advance royalty is guaranteed, but production royalty is dependent on the level of production sales.

Bonus Payment – Money or other considerations in addition to royalty payment paid to a lessor for the privilege of obtaining a lease.

Option – An exclusive right to explore and evaluate a mineral property during a specified time frame.

Lease – An agreement by which interests are transferred from one party to another, and with specific obligations and considerations.

Mineral Lease – A lease that allows a party to prospect, develop, and mine minerals from certain land areas.

All mineral leases should have at least the following sections:

1. Names of parties involved and any successors to those parties.

2. Legal land description

3. Royalty rate style, type, and stipulations with any bonus payment requirements, escalation clauses, and termination agreements.

4. Time period of lease and any renewal consideration, including assignability stipulations.

5. Any income or property tax responsibilities

6. Identification of lessee's risk and liability for any property damage.
7. Mining and reclamation plan, and monitoring conditions with the appropriate governmental agency should be outlined in detail. Also, the responsibilities of lessor and

lessee should be clearly defined, particularly in regard to overall costs, and liability, for any damage claims.

MINERAL DEPOSITS

MV of a mineral deposit at a given time is what that deposit is worth under a given set of legal, technical, and economic conditions. MV of this interest usually is arrived at through an income approach to value (IAV) involving a computation of projected future income discounted for time.

In short, the IAV is a method that converts capitalized future income into a MV on the assumption that a mineral property is purchased for the future income it can generate. It is here assumed that a purchaser would not be justified in paying more for the mineral property than the present value of the future income from the property; excluding any value for equipment, facilities, and good will. Future income is less valuable than present day income because of the time value of money, risk involved (likelihood of receiving income), required discounted rate of return through business life, and the time period required for return of the original investment. Projected future earnings are a primary factor in determining the MV of most mineral properties.

Gentry and O'Neil (1984, P.14) state:

> ...the preferred method for mining property valuation and the one unanimously used in commercial practice is the income approach.

Burmeister (1997, p. 383) indicates:

> There is little doubt that the discounted cash flow (DCF) analysis, providing a net present value (NPV) for each of a company's mining operations, is the most useful and effective valuation method as it combines both the short-term parameters and the effective, or projected mine life.

Runge (1998, p. 15) states:

> The evaluation of an overall project is usually undertaken by using DCF techniques.

Stermole (2000, p. 398) says:

> Polls of industry presently indicate that the Discounted Cash Flow Rate of Return (DCFROR), or Internal Rate of Return (IRR), the

rate of return that makes the after tax NPV equal to zero, is the number one economic evaluation decision method used by about two-thirds of industrial companies that use a formal economic evaluation procedure to evaluate the economic potential of investments. In this regard it is relevant to note that most major industrial companies use formal discounted cash flow investment evaluation procedures of the type described, discussed, and illustrated in this text.

Active mineral operations or projected future operations have value only because of the presence of reserves. Here, a single value is derived for reserves with the reasoning that all the costs for improvements, equipment, and any real and personal property used in the production of the reserves gives them value. If the reserves cannot be extracted at a profit, then there will be no future income and no profit. Therefore, the value of reserves on a property at a given time is the present value of all future discounted cash flows that come from owning the mineral property to be appraised. This does not mean that improvements, equipment, and so forth, have no value in themselves, but it does mean that sell-out (depreciated) value of them is not considered when appraising the value of reserves for say a Federal land exchange.

MV of a mineral deposit should closely reflect the total MV of a mineral interest. Royalty should not be added to the MV of a mineral deposit. In fact, it is a negative item in an IAV. A deposit owner-operator does not pay royalty. An owner who leases to another party does receive royalty income, but that income does not reflect all of the value of the mineral deposit. Otherwise, the operator (lessee) would be working for nothing.

APPROACHES TO MV OF MINERAL INTERESTS

PRIOR SALES APPROACH

The best evidence of MV is the prior sale of the identical mineral interests, reasonably recent, and at arm's length. Adjustments may have to be made to account for any conditions that have changed since the sale. However, these sales seldom exist, and the appraiser must try the next best approach which is for comparative sales.

COMPARABLE SALES APPROACH

Reasonably, recent arm's length sales of mineral interests in the general area of the property in question provide the next best evidence of MV. The sales must be comparable legally, technically, and economically to the subject mineral interest. If time has passed, or conditions are not exactly the same in the comparable sales, adjustments can possibly be made. In the case of mineral appraisals, except for mineral royalty, seldom can comparable sales be used properly. There are three main reasons for this. One is that there are very few sales of mineral deposits and/or rights. Two is that mineral interests are sold infrequently. Three is that there are few similar attributes among deposits. Most mineral deposits are unique in character. Mineral body sizes, different grades, different market and sales areas, and so forth are variable, all making it difficult to compare one with another. Often too many subjective adjustments and judgmental trade-offs must be made to arrive at a reasonable MV.

Adjustments by use of Comparative Attributes

If comparable deposits exist, it is possible with market approaches to value to make adjustments by consideration of a series of attributes and arrive at MV of the subject interest. With or without adjustments, the conditions of a comparative sale must be carefully investigated before it can be used as an indicator of MV. See Tables T-1, p. 25, and T-2, p. 26-27, for a comparison schedule.

Potentially Serious Problems with Adjustments

- Many variables exist in a mineral operation that are not related to the quantity of reserves. Therefore, deposits used for comparison should really be studied as thoroughly as the subject deposit so that any major differences that could affect value can be identified. Some of the variables are given below.

- Deposits that have produced for some time may not be properly compared with young, relatively underdeveloped, or non-developed deposits. Rate or potential rate of production is critical to consider in the comparison as well as product price and demand, all of which can influence the production rate.

Table T-1 Comparative Mineral Attributes for Mineral Interest Sales

Attributes	Operation	Operation
Dollar Value of Sale (if one exists)		
1. Date of Sale		
2. Condition of Sale		
3. Ownership		
4. Distance to Primary Market		
5. Accessibility		
6. Geologic and Geographic Settings		
7. Type of Deposit, Including Waste Factors		
8. Types of Products Sold or Could be Sold		
9. Sale Prices (F.O.B.) for Finished Products		
10. Production Rates and Annual Sales of Products		
11. Capital Cost Requirements		
12. Operating Costs		
13. Mining, Reclamation, and Environmental Stips.		
Total Adjustment ($)		
Recommended FMV		

JRE

Table T-2 Description of Attributes for Mineral Interest Sales

1. Date of Sale: When evaluating comparable sales data, the market data should be timely. The comparable sales must have occurred within a reasonable period of time of each other to maintain any degree of comparability. If there is a reasonable disparity, adjustments can be made.

2. Condition of Sale: Considered here are such items as lease assignment, possible extension and time periods involved, verbal lease, any built-in rate increases and their style of increase, different royalty rates for different products, minimum royalty payments, how royalty payments are made, down payments, options to buy, competitive or non-competitive sales, up-front performance bond payments to insure royalty payments as diligence requirements on production, method of computing royalty payments, termination of lease statements, ability to place on-site plants and equipment, plant processing fees, only certain products that can be taken, time limits to remove stockpiles, equipment purchase options, and so on.

3. Ownership: Refers to land and mineral ownership, right-of-way purchase, mineral rights and assignments, Federal, State, and County administered lands, private lands, split estate lands, assignments made to others that might make contracts less than "arms length".

4. Distance to Market: Factors to consider here are the location of market centers and haul distance to these centers in relation to the location of the deposit. Transportation costs, whether it is by haul trucks or unit trains, can significantly affect sales. Captive sales must also be considered, whereby the owner "sells" to himself, makes added value products such as asphalt concrete aggregate or concrete in their own hot or batch plants and sells delivered on the job site. Also, where the mine site is some distance from the plant, haul costs to the plant and the second handling costs must be considered.

5. Accessibility: Factors here center around the physical legal access to mining sites and milling and processing plants. Rights-of-way, road types and conditions, distance of roads required, land-locked conditions and so forth need consideration.

6 & 7. Geologic and Geographic Setting, Type of Deposit, including Waste Factor: Factors here to consider are the general geographic conditions such as elevation, topography, climatic conditions, vegetation, ect. General geologic conditions involve stratigraphic and structural complexities, broad nature of rocks (igneous, metamorphic, sedimentary, volcanic, and their interrelations. Types of deposits include residual (soil and grus), slope wash, land slide, wind blown, terrace bench, beach, glacial, ancient channel, and bedrock. Also, massive, disseminated, ledge, vein, contact, metasomatic, magmatic segregation, pegmatite, residual, layered. Waste factors are given in percent of total waste to total rock in the deposit and/or percent waste material to rock after entry into the milling or processing system.

8. Type of Product Sold or could be Sold: Considered under this heading are listings of finished products available for sale in the market place or "sold" to the operator himself for further processing. If the operation is in the initial stages of development or temporarily shutdown, then products that could have been made or could have been sold should be considered.

9. Sale Price (F.O.B.) for Finished Products: Here the concern is for the F.O.B. sale price of finished products at the first point of sale (before taxes, special discounts for large lots, trucking costs, added value costs such as bagging, and minimum load charge). If the operation is captive and the party "sells to themselves" at cost, a reasonable F.O.B. must be determined by comparison with other nearby similar operations.

10. Production Rate and Annual Sales of Materials: Important factors to be considered under this heading are the history of production and sales, present production and sales, length of time the plant has operated, and processing plant capacities (what is the rated capacity, and could additional products be produced?). Another factor is the number of stockpiles of finished products. Normal royalty contracts are written for payment when the product is put "across the scale" as it leaves the property. Stockpile inventories must be accounted for at the termination of the contract.

11. Capital Cost Requirements: Factors for consideration here are the cost of the various mining and milling equipment, plants, plant construction (stationary), buildings, roads, power line installation, water development, working capital, ect. Consider, also, whether or not the items are amortized and paid for in cash or by borrowed money.

12. Operating Costs: Items for consideration here are the costs associated with mining, blasting, milling and processing, transportation, and setting up portable plants. These costs are for the labor component for operating the equipment, repair parts, maintenance in general, power and fuel costs, rental fees, plant processing fees (for operators who plants on private ground away from the mine site), office supplies, training, insurance, and so forth.

13. Mining Reclamation, and Environmental Stipulations: Consider the type of constraint and control in contract stipulations: Blasting permits, mining and reclamation plans, use permits, land use zoning. Also, EIR's, EIS,s, soil replacement, tree planting, fencing. Also, water rights approval, waste water discharge requirements, health and safety, in general, must be considered. Reclamation bonds and specified equipment removal at the end of the contract and the above factors are included under the general heading of contract stipulations.

- Markets for produced products may not be similar.

- Production equipment may not be similar or of similar age and replacement capital can be of real concern.

- A buyer may not be knowledgeable of some important factors and pay more than a deposit is worth.

- In a competitive bid action one unrealistically high bid may establish an unrealistically high sales price.

- A buyer may have a special purpose in mind and pay more than a deposit is worth. An appraiser must be careful not to use conjectural or speculative evidence. A transaction must be at arms-length to be appropriate for comparison.

As can be seen from the above concepts, the most serious disadvantage in the comparable sales approach is the difficulty in accounting for unique characteristics between deposits that might be used for comparison. Nevertheless, the comparative sales method offers a technique for use of actual transactions in the market place for development of a MV. It can be used effectively in certain situations.

COST APPROACH

The cost approach is based on the following costs for: land, claims, options, leases, mineral rights, equipment, exploration and development, marketing and permitting studies, road development, and reclamation. Additional costs considered can include the purchase, transportation, and installation, of items to the site. In short, this approach assumes that the depreciated cost of things necessary to produce products from a mineral deposit is the MV of the mineral interests.

Depreciation is a term with two different definitions. In the cost approach, depreciation means a loss of value from any cause. Depreciation also means the difference between present replacement cost and present value of an improvement. In contrast, "book value depreciation" is what is used by accountants and mineral appraisers in the income approach to MV. The cost of investments that are deemed depreciable under State and Federal tax laws are allowed to be fully depreciated for full initial cost over set time limits as 3, 5, 7, 10, 15, 20 or 40 year periods.

In the cost approach to MV, depreciation represents a decrease in usability of capital improvements (utility) in two different ways:

1. The remaining economic life of a property is shortened

2. There is a reduction in net benefits (efficiency).

Depreciation and value reduction results from three main elements:

1. Physical deterioration with lowered utility (reduces value).

2. Functional obsolescence that requires needed improvements performance declines.

3. Economic obsolescence that decreases the desirability of property through outside sources, such as environmental factors, overall employment shifts out of area, and so forth.

In real estate interests, appraisal costs may have a relationship to value, generally because the costs are for new improvements, which increase the value of the property. This is not the situation with mineral interests. Most mineral interests are bought because the purchaser wants to receive timely income from them (some interests may be purchased as a tax write-off, and some operations may be bought and operated at a loss for a period of time in order to "break into" the market). How can capital costs for exploration and development contribute to the immediate income stream? The answer is that for mineral interests these costs do not contribute directly to income and "value" and can be measured only through the income and not by the costs involved.

The cost approach is quite unrealistic in a appraising mineral operations or mineral estates in terms of determining MV. Costs incurred in exploration development, and extraction of a mineral deposit rarely have any relationship to the MV of the deposit. After all, if the value of mine generates does not exceed the costs needed to bring it into production, the venture cannot be economically viable. Also, newly discovered mineral deposit with no improvements on it, but with clear evidence from exploration work and financial modeling that it can be profitable, has future value.

It is possible that a mineral interest will realize a large amount of income and a very high rate of return on the initial investment. More often, however, initial costs result in a zero net income and loss of capital investment by virtue of an uneconomic deposit or production

well. After all, if the value that a mine generates or can generate does not exceed the costs needed to bring it into production, the venture cannot be economically viable.

The tenuous nature of the cost approach to value is clear. An appraiser can over or under evaluate a mineral interest in grand fashion. This approach should not be used to appraise MV of mineral interests.

ROYALTY APPROACH

In this approach, it is assumed that royalty income is received from a mineral property, over a specified period. Appropriate allowance is made for depletion and taxes, and the cash flows are discounted at a specified percent rate of return over the period. The royalty rate used could be in $/ton or cubic yards, or as a percentage of the gross income. Inflation factors could be used in the analysis. Assumed royalty rate increases, with time, could be factored into the analysis.

A number of concepts must be assumed if one tries to use this approach. They are:

- That royalty income measures the MV of all mineral interests adequately, is reflective of the value of the mineral reserves in the ground (which it does not), and can be used for all minerals.

- That there are adequate reserves to provide income over the time period considered, and that reserves could be profitably sold over the time period. In short, the economic viability of the property is justified. After all, if the property is not economically viable there will be no income – royalty or otherwise.

- That the assumed rate of production over time is reasonably correct, and in harmony with results of market entry studies, a particularly acute concept in nonmetallic minerals.

- That the depletion schedule and income tax rates used for royalty income are correct. If the production rate is wrong, then it will follow that the tax structure is wrong.

- Lessors take depletion even if minerals were not extracted, and depletion is computed as though the minerals were removed. This latter credit must be figured for credit against future depletion when production of the mine resumes. If all minerals under the lease are not extracted, and a lease ended, lessors must adjust their capital account by restoring the depletion deduction taken in

prior years for the mineral royalty payment credits taken in advance. This same amount must be reported as income.

- That an appropriate percentage rate of return (discount rate) is used, and an appropriate percentage rate of inflation, if used, is correct. That royalty increases used under an actual or an assumed lease agreement is reasonable and justified.

- That any comparable royalty rate used is reasonably determined by proper adjustments and is specified as to how it is fixed, sales across the scale, rock removed from place, or percentage of gross income. How the rate was determined must also be discussed; actual under lease, comparative with assumed lease, and others. In addition, up-front payments or bonus bids for lease privileges must be accounted for. Payments maybe based on one-half of the expected annual production, and then worked off as production occurs. If an overriding royalty exists, it must be considered carefully. An overriding royalty is a retained royalty by a lessee when the property is subleased. If a property buyout privilege for the lessee exists it must also be considered.

Overall, the royalty income approach does not represent maximum future income that can be obtained from an economically viable mineral operation because only a portion of the production of reserves is considered. This approach has many problems concerning input dates for analysis, particularly for a property not in operation. Without economic viability analysis of the property in question this approach has no merit at all; no income, no royalty income. By the time an economic viability study is done, there is enough data to prepare an income approach to value (IAV).

Even where a property is under lease, a royalty is being paid, and the property is up for sale, the royalty approach is not fully correct. The new owner, particularly if he was the former lessee, will now pay no royalty and clearly the property will be worth more than just the royalty payments. For the lessee royalty payments are a cost of doing business and do not reflect income. If the new owner is not the former lessee and wishes to continue with the lessee, the royalty payment does not reflect all the income that can be generated from the property. It seems unlikely that an owner would sell his property for just royalty income. It is possible for a party to sell his royalty interest as an entity. It becomes just that, the sale of royalty income discounted appropriately for time, which represents only royalty income and not MV of all mineral interests.

UASFLA Guidance

Guidance given in the 2000 Uniform Appraisal Standards, book, Section D-11, P. 95-99 seems to imply from the cited histories of condemnation and taking cases that the royalty income approach is the only method to be used for the income approach to value for governmental appraisals. However, this implication is not correct and a mineral deposit (reserve) income approach can be used as long as it is not speculative.

As pointed out in Jack S. Foster, et. al v. the United Sates, 2 Cl.Ct. 426(1983) aff'd, 746 f.2d 1491 (Fed. Cir. 1984), cert. denied, 471 U.S. 1053 (1985) in a dolomite rock decision:

> "just compensation" means the full monetary equivalent of that property; owner is to be put in the same position, from a monetary standpoint, as he would have been without the taking...

At 427 the court said:

> "Royalty interest" is an interest of a passive landowner-lessor or of an inactive lessee;" "operator's interest" is the interest of a person with the right, the capital, and the ability to develop, produce, and sell the mineral; both are property rights which can be bought and sold.

At 448 the court said:

> Both Federal and State courts recognize the royalty interest and the operator's interest as component parts of the whole mineral estate.

At 428 the court said:

> The court (Court of Claims) also stated "the value of plaintiff's entire mineral interest was, in the absence of comparable sales, the fair market value of the minerals in place on the date of taking."

Royalty Rate Determination

General

Where appropriate to determine a royalty rate, it is possible by use of comparable sales (other royalty rates) to adjust or develop a rate for a mineral property coming on stream. Use of the 13 attributes given in

Tables T-1 and T-2 can lead to a new or revised royalty rate. This method can be useful for determination of royalty rates for mineral material sales (43 CFR 3600). For an example of this analysis, see Tables T-3, p.34 and T-4, p.35 .

Disadvantages

- May be difficult to monitor properly if adequate controls and checks are lacking. Periodic field checks are necessary.
- Should have higher royalty rate.
- If minimum monthly or periodic royalty payment is not required, the landholder may have to wait for sales of product by lessee.
- Minor risk of trucks bypassing scales to haul material to lessee owned plants, or stockpiles.

Production Verification

Regardless of the type of appraisal used, production verification can be implemented by checking sales receipts, monthly sales summaries, tax records, and insisting on regular submission of Haul Truck Tally Sheets (see Table T-5, p.36).

For operations selling several finished products with different f.o.b. prices and a significant waste factor, the appraisal and production verification should be through f.o.b. sales, usually in tons.

For any in-place appraisal, a monitoring scheme for production must be worked out in advance of the lease or sale and adhered to. For soft "running" material, very small sales of material, and replenishing stream or riverbed deposits, in-place appraisals are not appropriate because production verification becomes untenable. It is here emphasized that in most situations, even in stone quarries, rough visual estimates of volume removed is not sufficient for production verification.

Advance royalties, bonus payments, and penalty clauses for lack of production may affect royalty payments in either of the two methods of determination.

Table T-3 Comparative Information for the Competitive Sale of Sand and Gravel from the Indian Creek Site, Lake County, California

Contract Considerations and Conditions

As this is a competitive sale we recommend that bidding should be by initial submission of written sealed bids, followed by oral auction bidding after the sealed bid opening. All conditions and stipulations of the contract should be made public in writing prior to/or at the same time the announcement of auction date is set through publication.

The following considerations and conditions are recommended in regard to the competitive mineral material contract for the sale of sand and gravel fromthe Indian Creek site:

A. BLM Sales Contract Form 3600-5 (January 1984) be used (LD-APP-1, pp. 42-44) with the following attachments:

1. Regulations at 43 CFR 3600 (LD-APP-2, pp. 45-48).
2. Stipulations for mining, road construction, reclamation, and environmental and safety controls.
3. Bond requirements (for reclamation and payment of royalty).
4. Description of method for monitoring in-place volume of material removed from BLM administered land.
5. Haul Truck Tally Sheet (p. 49) to be turned in monthly.
6. Legal description and a map of the BLM administered land involved; 240 acres more or less.

B. Mineral material should be specified as sand and gravel with the following conditions:

1. Total in-place sale amount of 600,000 $yd.^3$ more or less (Lange Brothers should be allowed to go to bench design).
2. Minimum acceptable bid amount of \$0.40/$yd.^3$, noting that this amount will be reappraised every 2-years from the date of the signed contract.
3. Total minimum price for in-place material is \$240,000.
4. Ten-year time period for extraction.
5. Installment payments are \$24,000 each.

C. Before operation can begin the successful bidder should be required to submit to the BLM the following items:

1. An acceptable reclamation bond and a contract performance bond of 20% of the total contract price (\$48,000).
2. Evidence of liability insurance.
3. An approved mining and reclamation plan.
4. An initial payment equivalent to two installment payments.
5. A statement indicating that the BLM can inspect appropriate sales and other record data with 15 days notice.

Market Approach to Value (In-Place Basis)

There are two basic methods for the market approach to value for sales of material or royalty rate determination. The best method concerns prior and reasonably recent sales for materials from the same property, but no material has been sold from this property. Therefore, we consider the next best method, which is were there are comparable sales or rates, reasonably recent, from sand and gravel operations that are comparable technically and economically to the subject operation. With this method it is often possible to make adjustments to arrive at a fair market value for the sale or rate.

Three lease agreements were given to Evans by Lange Brothers during his visit to their office on January 24, 1986 (see Attachments D,E, and F). These are private contracts and for extraction of sand and gravel from Middle Creek some 30 road miles to the northwest (see M-1-2, p. 5). As of the date of this report these lease agreements are the only ones available to us.

Table T-APP-1 (p. 39 - developed by J.R. Evans and George DaBal, May 9, 1985) was used to test for comparability of the Quinn lease agreement (the most recent and still in force) with the subject sale and to make resonable adjustments so as to obtain a fair market value for the subject sale.

The Stuart lease agreement was not used as it expired on September 1, 1984, and the Perea lease agreement was not used because only about 1,000 $yds.^3$ are produced annually from the lease agreement site.

Under the Quinn lease agreement the Lange Brothers are paying at a rate of \$0.75/$yd.^3$ for about 10,000 $yds.^3$ of finished products taken from creek and creek area sand and gravel. Material is trucked to the Kelseyville plants of the Lange Brothers. The distance to Kelseyville from the Indian Creek site is about 10 miles further than from the Middle Creek areas to Kelseyville, however, there will probably be f.o.b. sales from the Indian Creek site. Also the Indian Creek site is much closer to the Middletown area (see M-1-2, p. 5). Lange Brothers will be in direct competition with Hidden Valley Sand and Gravel, Inc. who sell a variety of finished products, operate in the North Fork of Cache Creek, and have a plant and sales yard adjacent to the entry road from State Highway 20 to the Indian Creek site (see M-G-1, p. 22). Pickup for Lange Brothers will be at their plant site (see M-G-1, p. 22). Hidden Valley SS, Inc., is operating under an old long term lease and they did not wish to make conditions of the contract public. They did say that their royalty rate was for finished products.

Lange Brothers, if successful bidder, will have a 10-year lease on BLM administered land and presumably ownership of the private land under their option to buy. Available yardage from both the BLM and private lands may be as much as 3,000,000 yards.

Creek mining will be less expensive than for the proposed subject operation. Environmental constraints are severe for creek mining and do cause mining costs to rise, however mining costs will be high for the Lange Brothers operation. Also, the Brothers will have cap tol expense outlay for purchase of the private land.

Not only will it be more expensive to mine the landslide area than to mine creek areas, but there is a significant amount of waste at the Indian Creek site. Clays will require strong washing for removal and proper tailings ponds for their retention as waste. Ponds will have to be emptied periodically. Also, over runs of sand will be required to produce a sufficient amount of coarse sizes for the finished products. This is true because of the overall relatively small size of coarse clasts in the conglomerate, and because of the abundance of "rotten" sandstone clasts that will crumble to sand, and/or clay on processing.

On consideration of these matters and a study of the data in Table T-APP-1 and Attachment G, adjustments were made for each of the attributes. A total adjustment of -\$0.35/$yd.^3$ was determined. Therefore, we find a rate of \$0.40 $yd.^3$ to be the fair market value, and the minimum acceptable bid rate (subject to considerations and conditions mentioned on pages 41, and 50).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MINERAL REPORT

Serial Number

CA-050-~~MS~~-86-1

J. R. Evans — Prepared By
(Signature)

J.R. Evans (RG 431; CEG 958), Senior Technical Minerals Specialist, and

Peter G. Milne, Geologist — Peter G. Milne
(Title)

May 9, 1986
(Date)

Table T-4 Comparative Sales Data for the Competitive Sale of Sand and Gravel from the Indian Creek Site, Lake County, California

NUMBER	ATTRIBUTE	Number of Sale	1/ 2	SUBJECT SALE
		Name of Buyer & Seller, & Location of Property	George P. Quinn - Lessor to Lange Brothers, Parrel 9, Lake Co. Recorder's Plat Book B at pp. 1-5, as of 6-13-79; Middle Crk., 7 mi. ± N. of Upper Lake, Lake Co. site adj. to Elk Mtn. Rd.	BLM lessor to highest bidder at a competitive sale; Indian Creek area, 7 miles ± E. of Clear Lake Oaks, Lake Co.
		Dollar value of sale $/yd.^{3}, $/Ton, % GI	$0.75/yd.^{3} or $0.50/ton	$0
I	DATE OF SALE		Lease signed 7-1-85, ends 6-30-86 (1 yr.) Adj. $0.00	10-year lease to start 1st 3rd quarter, 1986.
II	CONDITIONS OF SALE		Lessee cannot be assigned. Lease has possible 5-yr. extension, bur will be renewed annually. Lessor can inspect lessee's records. Royalty payments on finished products w/in 30 days of material sales. Royalty rate increase possible, and based on overall price increases of finished products in Lake Co. Minimum annual payment of $500.00 due annually on July 1 (also royalty payment). Adj. $+0.05	Competitive sale to highest bidder at BLM auction see 43 CFR 3600 (pp. 45-48, this report) and BLM Contract 3600-5 (pp. 42-44, this report) for details of conditions of sale. Two installment payments of 10% of sale price, plus bond needed to bid (see pp. 41, 49 this report). Allowance for 600,000 yds.^{3}, or more to mine to reach design. Lease can be assigned.
III	OWNERSHIPS (PRIVATE SECTOR, GOVERNMENTAL AGENCY, SPLIT ESTATE) AND ASSIGNMENTS		Private surface and mineral estate. Adj. $+0.02	Private and BLM-administered land; after extraction on BLM land under contract, mining will be entirely on private land.
IV	DISTANCE TO MARKET		Est. 12¢ yd.^{3} mile in 20 yd.^{3} bottom dump trucks. 3.36 - 2.16 = 1.20 ÷ 2 = 60¢; assign 1¢ for every 10¢ = 6¢ Material trucked from mine site to Lange Broth. processing, concrete and asphalt batch plants in Kelseyville (see M-1-2) about 18 miles. 18 mi e 20 yd.3 x 12¢/mi. = $43.20 ÷ 20 = $2.16/yd.^{3} Adj. $-0.06	About 28 miles to Kelseyville to Lange Brothers plants. Will have f.o.b. sales at site also. Assume 50% f.o.b., 50% shipped to Kelseyville. 20 mi e 20 yds.^{3} e 12¢ yd.^{3}/mi. = $67.20 ÷ 20 = $3.36/yd.^{3}
V	ACCESSIBILITY		Readily accessible, adjacent to Elk Mtn. Rd. Adj. $-0.02	Access difficult, need 4-wheel drive. Will have to construct dirt haul roads and improve dirt access roads. Need to build bridge across N. Fork of Cache Creek and make improvements at Hwy 20 and access road intersection for truck traffic.
VI	GEOLOGIC AND GEOGRAPHIC SETTINGS		Middle Creek and banks along Middle Creek in area of general low relief. Creek contains sand and gravel to an undetermined extent. Adj. $-0.03	In hills underlain by soft sedimentary rocks of Cache Fm and in Indian Creek. Bedrock excavation site in across active landslide. Will have to mine through landslide scarp area also. Extensive SG materials.
VII	TYPE OF DEPOSIT, INCLUDING WASTE FACTOR		Streambed and bank deposit with <2% waste (by wt.) 2/25 = 1/13 ÷ 2 = 7 assign 1¢ for each 2% = 7¢ Adj. $-0.07	Hillslope, bedrock deposit and narrow streambed and bank deposit. Waste factor 25% + by wt. Overall size of plant also relatively small; abund. flat clasts; "rotten" con. to clasts; clay-rich. Sale is for in-place material.
VIII	TYPE OF PRODUCTS SOLD OR THAT CAN BE SOLD		Concrete aggregate, road base, asphaltic concrete aggr., drain rock, concrete sand. Adj. $0.00	Concrete aggregate road base, asphaltic concrete aggr., drain rock, concrete sand.
IX	SALE PRICES (F.O.B.) FOR PROCESSED MATERIAL (OR IN-PLACE MATERIAL)		f.o.b. prices for products about $5.25/ton, finished, at Lange Brothers plants in Kelseyville. The price is $7.88/yd.^{3}. Adj. $0.00	Con. agg. 3/4" to 3/8" $7.75/yd.^{3} 1.4 tons/yd.^{3} Pea grav. 3/8" to No. 4 $7.75 " 1.3 to 1.5 Con. sd. - No. 4 $8.75 " 1.5 Info from Hidden Rd. base (Cl. II) 3/4" $8.50 " 1.6 Valley Inc. Hwy Drain rk. 1 1/4" to 3/4 $7.75 " 1.4 20 SG plant - Con. agg. mix. $8.25 " 1.5 f.o.b.
X	PRODUCTION RATE AND ANNUAL SALES OF MATERIALS		10,000 yds.^{3} annually. 10,000/79,000 = 1/8± assign 1¢ per unit = 8¢ Adj. $0.08	Estim. max. of 100,000 tons/yr. or at bedrock yds. (1.6 tons/yd.^{3}) used 63,000 yds.^{3}±, but w/25% waste factor used to mine 79,000 yds.^{3}/yr. Will be deficiency of coarse clasts and will cause plant overruns to achieve rec. etc. grading therefore will be surplus of sand. More raw material available.
XI	CAPITAL COST REQUIREMENTS		Minor; SG mined by loader, placed into 20 yd.^{3} bottom dump trucks, and shipped to Kelseyville plants of Lange Brothers for final processing. Assign 5¢ for each major factor, i.e.: road struct (1), land purchase (2), equip. (3) therefore, 3 x 5¢ = 15¢ Adj. $-0.15	Need to purchase private lands which are under option-to-buy; need scrubber, and conveyor belt systems. May need impact crusher. Lange Brothers have some portable plant equipment. Have to build two tailings ponds; road construction; build creek bridge, and improve Hwy 20 access road intersection.
XII	OPERATING COSTS (MINING, PROCESSING, PLANT PROCESSING FEES, AND OTHER)		Actual costs not known, but crushing, screening, washing, and stockpiling done in Kelseyville plants. Adj. $-0.07	Not known, but will need scrubber for clay, and probably impact crusher for flat particles. Costs will be higher, but partly balanced by f.o.b. sales at site, because no truck haul to Kelseyville for part of materials.
XIII	CONTINGENCIES (STIPULATIONS) OF SALE, REGARDING MINING, RECLAMATION, BONDING, HEALTH AND SAFETY, ACRES OF LAND AVAILABLE, USE PERMITS, RIGHTS-OF-WAY, AND OTHER		Lessor requires lessee to obtain use permit from Lake Co. Must maintain roads. Lessee can construct portable buildings and equipment. All equipment, etc. to be removed w/in 30 days of termination of lease. No bond. Lessee must maintain liability insurance. Adj. $-0.10	2/ Mine and reclamation plan must be approved by BLM. Must follow 43 CFR 3600 regulations. Monitoring for yds.^{3} mined set up by BLM Ukiah DO (to-place sale)' see pp. 1, 2 in text. Need liability insur. Need appropriative rt. from CA St. Water Rts. Bd. to take water from lake.
			TOTAL ADJUSTMENT -- $-0.35	
			ADJUSTED RATE -- $ 0.40	

JRE & CSD 5-9-86

1/ See Attachment E
2/ See Attachment C

DATE: May 9, 1986

NAME AND TITLE: J.R. Evans (RC 431, CEC 938) Sr. Tech. Min. Spec.

Table T-5

HAUL TRUCK TALLY SHEET

Contract # _____ Date _____

Name of Mineral Operation _____

_____

Location of Mineral Operation _____

_____

Mineral Commodity _____

Truck Type and Capacity in Cubic Yards _____

License Number _____

Ticket Number _____

Start Time _____

Stop Time _____

Down Time _____

Hours Worked _____

Tons or Yards Loaded (specify) _____

Driver's Company _____

Driver's Signature _____

Comments _____

_____

_____

_____

_____

_____

_____

_____

_____

JRE 9-89

Rate Books and Area Wide Appraisals

Some BLM offices have developed what has become known as rate books for making comparative sales (royalty rate determination) for Mineral Material Sales (43 CFR 3600). These books are usually developed after making what is called an area wide appraisal. The area wide appraisal involves compiling royalty rate (sales) data available to the BLM, by mineral commodity, and placing them in a rate book. Rates are reviewed periodically for rate changes.

Advantages

- Rapid
- Low Cost per appraisal
- Can be done by nearly anyone
- Suitable for small areas where similar technical and economic conditions exist (i.e., community pits, common use areas).
- May be suitable for a few years.

Disadvantages

- High initial cost in time and money to set up books (data gathering) if used for other than very small areas.
- Can result in improper appraisals because of lack of enough information and interpretation by non-mineral appraiser.
- May be unsuitable in large complex market areas and in various market areas in a region.
- May be unsuitable where a variety of products in a variety of tonnage are sold at a wide range of f.o.b. prices.
- May be unsuitable where a high local competitive bid is received for a mineral sale.
- Generally does not distinguish between in-place and across the scales royalty rates (sales).

- Some material moved from original site, but still in extraction area, may cause problems with yards removed calculations if the material is not properly surveyed.

INCOME APPROACH FOR MINERAL RESERVES

BASIC CONCEPTS

In this approach, income from the analysis of reserves, is converted into an estimate of value through economic analysis by means of cash flow (CF) or discounted cash flow (DCF) modeling. The basic assumption is that a mineral deposit is purchased for the money income it will produce. That money is available for developing the deposit cannot be automatically assumed and financial analysis (how a project will be financed) may be necessary. In this analysis, the cost of raising money by borrowing, issuing new bonds, debentures, common stock, or related debt/equity offerings may be necessary – financial cost of capital.

There are several basic concepts used in the income approach and are as follows:

- Capitalized future income is converted to value based on the assumption that a mineral deposit is, or can be, extracted for the future income it will generate.

- Future income is less valuable than present day income, because of the time value of money, risk involved (likelihood of receiving income), required discounted rate of return through project life years, and the time period for return of the original investment.

In this approach, the duration and quantity of income must be estimated. If the mineral deposit has been in production for several years and the only time period of evaluation is the present, it is necessary to enter in with the analysis as best as possible at the start of the present time period. For economic evaluations for part time periods a mineral appraiser has a difficult task, and must do the best they can with historical, technical, and economic data.

- Mineral deposits have real value only because of the presence of reserves. It is true, that all costs for improvements, reclamation, equipment, and real and personal property used for the production of reserves must be balanced against income. However, if a mineral cannot be extracted at a profit, there will be

insufficient future income and no value. The reserve guide used by the BLM given in Attachment A-2. It is important a to note that only two classification of reserves are to be considered- proven or probable.

It is not here implied that improvements, equipment and so forth, have no value in themselves, but rather that their sell out (depreciated) valued is not considered in determining the value of the reserves. The CF or DCF analysis is based on the economic viability of the mineral operation and how much the mineral reserves are worth at a given time under given legal, technical, economic, and market conditions.

- Projected future annually escalated earnings, with an appropriate discount rate over the determined project life years (PLY) to determine the after tax net present value (NPV) is to be used. If the NPV is positive, then the mineral operation will earn a higher percentage rate of return than the discount rate indicates; if negative, the mineral operation will earn less; if zero, the earning equals the rate of return. After any risk adjustments, the NPV is the basis for determining the MV.

- DCF analysis should not be for more than about 20 years of productive operation life and are adopted, insofar as possible, to the actual systems used by mineral operations. If a deposit is not developed, usually one to three years of lead time to production is adopted. To carry an economic analysis for more than 20 years of productive life, even though reserves may have a greater life at the projected rate of production, is not generally tenable. The 20 year future value of a dollar today, at 15%, is only about $0.06. In addition, risk factors, adequacy of escalation rates, and the discount rate used are already stretched at 20 years of life. Finally, there is no minimum rate of return or NPV specified by law or regulation.

- Appropriate tax framework must be used in the DCF analysis. Many actual or proposed mineral operations that do, or could operate on Federal lands are large corporate ventures requiring the use of corporate tax frameworks, rather than individual tax frameworks.

Consideration should be given to expensed (deducted fully in year incurred) and capitalized (not taken in year incurred and over more than one year) costs, loan interest, amortization concepts, and any loss carried forward. Some preproduction costs may have to be sunk. Most

of the time, the value of depreciable mobile cost items are recovered by using the Modified Accelerated Cost Recovery System (MACRS).

Depletion allowance benefits are usually recovered by percentage depletion at the appropriate percent of net revenue from commodity sales. Of course, the deduction for depletion cannot exceed 50 percent of the taxable income after all deductions, except depletion and deduction for net operating loss carried forward. Where depletion allowance exceeds the 50 percent limit, the 50 percent limit figure is usually used in computation of taxable income.

State and/or county tax frameworks vary and must be accounted for adequately. For example, California property taxes are ad valorem (at value), prefederal taxation making an actual figure impossible to use as an input to the DCF, unless actual data from company records can be used. Therefore, it is reasonable to estimate these taxes at one percent of the net revenue on an annual basis. Where an operation is ongoing, the actual tax framework elements should be used to help determine value. Where there is no operation, but one is feasible, the mineral examiner should generally use full rates in consideration of tax framework items. A MV determination on mineral operations before taxes is improper. The tax framework is of major importance and must be considered fully, because it can drive an apparent profitable operation into one with a negative cash flow.

USE OF A DCF MODEL FOR ANALYSIS

Properly determined input date and considerations must be used and/or verified, and placed in an appropriate economic model to make the income approach to value realistic. If there are no facilities developed adjacent to the mineral deposit, then inputs must be developed from scratch using Mining Cost Service, trade magazines, technical, economic, industrial, and tax literature, and, most importantly, the mineral appraisers experience. If an ongoing operation exists, then most information can be verified by checking statements, purchases, reserves (grade and tonnage), production, costs, income, taxes, and other financial records, as appropriate. Where data cannot be verified, or verified only in part, the appraiser must determine inputs and go on with the analysis.

Depending on the complexity of the deposit or the mining operation occurring or projected, information that is to be used in the economic analysis of the deposit may be acquired from a proponent and/or acquired through field investigation of the property. Any information

acquired from a potential or actual operator must be verified to assure its application and acceptance in the economic analysis.

It may be necessary for an operator to provide specific information or analysis that may be requested by the mineral appraiser to independently verify data. In large operations, the complexity of data supporting reserve estimation, pit design, and mining feasibility provides small opportunity for "fixing" or "rigging" data. Correlating known pieces of information from the data allow a check for verification purposes. For large bulk disseminated gold deposits, company data may be required to correlate the exploration reserve grade model, production records, and blast hole grade model. For small mines, verification of data usually rests with the mineral appraiser's sampling, testing, and modeling.

It is important that the mineral appraiser analyze and describe the deposit grade and tonnage from data acquired during the examination of the property. Verification of this data should be discussed in the report, including which method of verification was used, confidence of the examiners verification data, and whether the information obtained by the proponent is acceptable to be used in the economic analysis of the deposit.

The discussion should focus on the data acquired by the mineral appraiser, and how it correlates with information on the property provided by the proponent. For large disseminated gold operations, comparison of drill hole data, deposit grade and tonnage model(s), and production logs or reports can be used to verify the acceptance of the technical and economic data provided to the appraiser. This information may be included as attachments to the report. Illustrations should show examples of deposit grade and tonnage models, drill hold grade calculations, and pit design. All this information should be used to correlate grade and tonnage figures for acceptance in the economic analysis.

Discuss any variance in data, and include a discussion on which data will be considered by the examiner and, why other data provided by the proponent will not be considered in the mineral appraisal.

Also, include a discussion of certain data that cannot be totally verified and must be accepted as provided. This includes specific proprietary operating costs, associated feasibility studies, tax allowances, deductions and credits, and other information. If verification cannot be made, the report must address these issues. Discuss the effect the data may have

on your conclusions if the data is not used. Also, discuss any data that is inaccurate, dated, or incorrect.

Present the data and analysis in a logical and structured way before use in the DCF model. Use projected future annual escalated earnings with an appropriate discount rate over the determined operational life in years to find the after tax net present value (NPV). Appropriate tables and graphs must be presented.

All assumptions and concepts, and data in regard to input items used in the analysis must be explained. The main elements of concern for analysis are:

- Mineral commodity uses
- Market and market entry studies
- Rate of production, grade, and recovery factors over time of analysis based on tonnage and grade factors, market entry, and waste factors.
- Selling prices of products (f.o.b.), escalated
- Gross and net revenues
- Operating costs, escalated
- Exploration and development costs.
- Depreciable, non-depreciable, and working capital costs (including reclamation and environmental costs), escalated.
- Tax elements (corporate or individual), such as, State or County income tax, Federal income tax, loan interest, depreciation, depletion, and amortization.
- Net incomes
- Operating cash flows
- Salvage value
- Cash flows

- Escalation rates used (general inflation rate should not be used).
- Discount rate used
- Net Present Value (NPV)
- Risk factor

Table T-6, p.44, shows a DCF model format developed by J.R. Evans .

TECHNICAL CONSIDERATIONS FOR DCF MODEL

A DCF analysis can be readily manipulated by inaccurate input data. Changing the discount rate from a "true" market rate by adding a percentage increase for risk, or an inaccurate inflation/escalation projection, or other transaction costs, etc.., can decrease the NPV. If production is not at the planned rate or does not start on the planned date causing an annual short fall in planned revenues, the result will be a decreased annual income (overestimation). Inaccurate forecasting of product sales prices or market prices fluctuations can cause either over or under evaluation. Underestimating reserves, or inaccurate measuring dilution or other recovery problems can cause premature exhaustion of reserves, terminate the project before the planned date, and decrease the NPV. In short, all input items are critical and must be calculated with a great care in order to obtain an appropriate evaluation.

Land Status, Use, and Access

Data must be assembled and carefully studied to make sure of any limitations and problems that would influence the appraisal (no permission to extract minerals, no or limited access, and so forth).

On Federal lands where legal descriptions may be by section, township and range, parcels can be difficult to locate in the field. Mining claims, leases, prospecting permits, rights-of-way, split-estates, withdrawals for certain areas, adjacent federal and private land boundaries, and so forth are cause for real concern. These data are the first to check in any mineral appraisal as they can profoundly affect the process by virtue of an outside party having a valid existing right on the subject land in question. Also, status must be checked closely on private lands adjacent to Federal lands to be exchanged because they may be zoned so that no mineral operation would be permissible after exchange.

Table T-6 Discounted Cash Flow Model

					Calander Year	2003	2004	2005	2006
					Project Life Year	0	1	2	3
LINE	FUNC	ITEM	UNIT	SYMBOL	E FAC				
1		Total Produet Mined	tons, yd3	PM	3.00%				
2	x	Grade	oz/ton,lb/ton	G					
3	x	Recovery Rate	%	RR%					
4*	=	Recovered Produet	tons, oz, lb	RM					
5	x	Selling Priee	$/unit	SP	2.00%				
6*	=	**Gross Revenue**	$	GR					
7		Royalty Rate	$/unit	RR$					
8*	x	Total Produet Mined	tons, yd3	PM					
9*	=	Royalty Payment	$	RP					
10	or	Royalty Rate	%GR$	RR%					
11*	x	**Gross Revenue**	$	GR					
12*	=	Royalty Payment	$	RP					
13*		**Gross Revenue**	$	GR					
14*	-	Royalty Payment	$	RP					
15	+	Reeaptured Exploration Costs	$	REC					
16*	=	**Net Revenue**	$	NR					
17		Operating Cost Per Unit	$/ton, yd3	OCU					
18	x	Produet Mined, Milled, Proeessed	tons	PMMP					
19*	=	Operating Costs	$	OC	2.50%				
20*		**Net Revenue**	$	NR					
21*	-	Operating Cost	$	OC					
22	-	Exploration Cost	$	EC					
23	-	Development Cost	$	DC					
24	-	Loan Interest	$	LI					
25	-	Depreciation	$	DP					
26*	-	California Prop Tax (1.0% of NR)	$	CPTX					
27*	=	**Taxable Income Before Depletion**	$	TIBD					
28	x	50% limit on Depletion (0.5 x TIBD)	$	50%DLP					
29		Depletion Rate(%)	%	DPLR					
30	x	Depletion _____% of NR	$	%DPL					
31*	-	Depletion (lower of % NR, or 0.50 x TIBD)	$	DPL					
32*	=	**Taxable Income After DP**	$	TIAD					
33	-	Net Operating Loss Carry Forward	$	NOLF					
34*	=	**Taxable Income**	$	TXI					
35	-	State & Federal Income Tax	$	SFTX					
36*	=	**Net Income**	$	NI					
37*	+	Depreciation	$	DP					
38*	+	Depletion	$	DPL					
39*	+	Net Operating Cost Carry Forward	$	NOLF					
40*	+	Exploration Cost	$	EC					
41*	+	Development Cost	$	DC					
42*	+	Interest on Loan	$	LI					
43*	=	**Operating Cash Flow**	$	OCF					
44	+	Salvage Value	$	SV					
45*	-	Loan Intrest	$	LI					
46	-	Nondepreciable Capital Cost	$	NCC	2.75%				
47	-	Depreciable Capital Cost	$	DCC	3.00%				
48	-	Mineral Acquisition Costs	$	MAC					
49	-	Royalty Buyouts	$	RB					
50*	=	**Cash Flow**	$	CF					
51	x	Discount Rate Factor@__ % (End of Year)	10.00%	DRF	10.00%				
52*	=	Discounted Cash Flow	$	DCF					
53*		Cumulative DCF (Sum of DCF)	$	CDCF					

JRE 03

BLM maps and records, county assessors plat books, and ownership data should be checked, and copies made of appropriate documents and maps. Existing mineral rights may hold up or prevent certain mineral estate exchanges, conveyances, and "sales" of mineral materials under 43 CFR 3600.

A DCF analysis can be readily manipulated by inaccurate input data. Changing the discount rate form a "true" market rate by adding a percentage increase for risk, or an inaccurate inflation/ escalation projection, or other transaction costs, etc. can decrease the NPV. If production is not at the planned rate or does not start on the planned date causing an annual short fall in planned revenues, the result will be a decreased annual income (overestimation). Inaccurate forecasting of product sales prices or market prices fluctuations can either over or under evaluate. Underestimating reserves, or inaccurate measuring dilution or other recovery problems can cause premature exhaustion of reserves and terminate the project prior to the planned date and decreasing the NPV. In short, all input items are critical and must be calculated with great care in order to obtain an appropriate evaluation.

Physical Features and Improvements

These topics need to be analyzed to see if the mineral operation or mineral property might have limitations for development. A rugged and remote undeveloped brush covered mineral property with no nearby water and power facilities will involve significant and specific costs to bring it into production.

Geology and Mineral Deposits

Pertinent aspects of regional and site-specific geology, structural geology, and mineral deposits must be noted and carefully analyzed. These features are critical to any mineral interest appraisal and must be developed and/or analyzed by a knowledgeable mineral appraiser.

Reserves

Simply put, reserves are the measurable amount of suitable grade minerals that can be extracted at a profit. Calculation of the quality and quantity of reserves are critical data for a mineral appraisal. A professional geologist/engineer and/or a mining geologist/engineer is needed to handle the aspects involved with reserve calculations, or to

review the calculations of others. Make sure all terms used in regard to tonnage and grade of reserves are clearly defined (see Attachment 2). Tonnage factor, average grade, cutoff grade, sample area influence, and so forth are examples of critical terms.

Because methods used to present tonnage and grade models will vary with different types of deposits. Ensure that all units of measure are shown in computations, tables, and illustrations when compiling grade and tonnage information. This provides a calculation check for the reader and helps to integrate the information with other parts of the report.

Ensure that all units of measure are compatible with accepted industry practice for the type of deposit under investigation. For example, units of grade for lode gold deposits should be in troy ounces per ton, instead of percent; units of grade for placer gold deposits should be in dollars per cubic yard, instead of dollars per ton; and so forth.

Fully describe the methods and models used to determine grade and tonnage, and mining blocks. Illustrations should be used, so the reader can easily see the distribution of different grades within the deposit. Geology and other maps and cross-sections, should be used to illustrate the locations of sample and/or drill sites and the amount of influence of each site. Use tables, complete with full titles and accurate sample numbers, to show grade calculations and tonnage or volume assigned to blocks of influence. Use additional maps and sections to illustrate the distribution of material of different quality in the deposit as a whole.

Waste Factors and Recoverable Material

Actual and projected tons and grade of material are entered for each project life year (PLY) of production. The recovered material is key and reflects the sales product after the recovery (waste) factor is applied. Production rate and production time are based on market entry (share), amount of reserves, and waste factor. The mineral appraiser must determine to the best of their ability how much the recovered material is entering, and can in the future enter the market place for sale. If the commodity is gold, the assumption is you can sell all you can produce. If the commodity is say, carbonate rock, all that can be sold annually by individual use must be determined through a study of past production records and/or a market entry study based on product specifications, demand, and market share. Future sales can be documented through contracts or letters of agreement assuring future purchases. With no contracts or agreements, a mineral appraiser is left to their own initiative to decide on market sales rate and entry possibilities.

MARKETABLITY CONSIDERATIONS FOR DCF MODEL

Marketability is the ability of a mineral product to enter a market place for sale. The appraiser should describe the factors that affect the ability of the mineral products that are, or can be sold in a market place. Each product's use should be described. Minerals can occur either as small percentages of the rock in place, such as metallic minerals, or as minerals that comprise the bulk of the rock in place, such as most industrial minerals. High price commodities, such as precious and other metals, generally do not compete for market shares and, therefore, do not require a marketability analysis. Market entry is assumed. However, a market entry study is usually required for nonmetallic minerals, because strong competition is required for a market share.

Because of the significant difference between metal and nonmetal markets, a few broad concepts for consideration are given below.

For metals:

- Valuable material may be only a percent or less of total material mined.
- Usually much more capital money is required for the sophisticated mining and processing equipment needed.
- Usually operating costs are higher.
- Analytical testing mainly for metal content; relatively cheap; many labs available to do testing.
- Transportation costs for processed or refined metals are a very small part of the sales price.
- Sales price is quite high compared to nonmetals.
- All metal produced can usually be sold.

For nonmetals:

- Valuable material is the bulk of material mined.

- Usually less capital money required for mining and processing equipment than for metals.

- Operating costs are usually lower than for metals.

- Analytical testing for chemical and physical properties are involved; relatively expensive; few labs available to do testing. Some tests that are usually required are as follows:

Color	Durability
Brightness	Permeability
PH	Absorption
Mineralogy	Bulk density
Chemical Composition	Hardness
Adsorption	Porosity
H_2O content	

- Deposits should be close to the marketplace to be economically viable.

- Transportation costs are usually a significant part of the sales price of processed materials. Bulk f.o.b. sales can be made and transportation costs are then negligible.

- Sales price can be low compared to metal prices.

- In contrast to metals, a highly competitive marketplace has to be entered. This is no guarantee that processed material can be sold. A seller may have to literally take away business from a competitor through several means:

  1. Produce a superior quality product in terms of physical and chemical characteristics.

  2. Produce and process a wider variety of quality, and even new, end products.

  3. Provide better overall service; more timely delivery of product, better salesmanship, management innovation, more highly trained staff.

  4. Provide lower sales prices of end product through efficiency in reducing capital and operating costs, energy costs, and environmental costs.

5. Provide more sales potential with larger and innovative processing plants.

The following topics must be considered in a marketability analysis:

Market Area

The market area is of real concern as it refers to that general area in which the mineral commodity can be sold. For example, gold and petroleum can have worldwide markets. However, sand and gravel operations may have a market area with a radius of 10 to 25 miles.

Data should be presented in map or plat form, showing the aerial limits of the market area, and the number of operations selling similar products. If the market area is large, or undefined, the description of the general area should be given in narrative format. The description should include the farthest sale point and the area where most of the commodity is sold. Some specialty clays and whiting grade carbonate rock may have a world wide market area.

Selling Price

Selling price of an individual commodity such as gold, or the weighted average selling price of a group of related commodities, such as aggregates produced from the same plant, must be confirmed for an actual operation, or determined for a proposed operation (Tables T-7, p.50, T-8, p.51). The unit of time is generally one year. Selling prices are determined as F.O.B., or Freight on Board, meaning here the first possible point of sale price without any value added items such as transportation or packaging. For example, the selling price of processed concrete sand is determined as that price charged to a customer leaving the plant yard and assessed across a weigh scale, not the price of concrete sand delivered 10 miles away or as mixed in concrete with cement and other aggregates. Selling prices should be escalated on an annual basis.

Where varieties of mineral commodities are to be sold at the same plant at quite different F.O.B. prices, a weighted average selling price can be approximated: Consider 1,000,000 tons of product sold at four different prices.

35,000 tons @ $38.00/ton=	$1,330.000
5,000 tons @ $35.00/ton=	$ 175,000
320,000 tons@ $55.00/ ton=	$17,600,000
640,000 tons @$34.00/ton =	$55,680,000
1,000,000 tons	74,785,000

Table T-7 Annual Gold Prices with Percentage Change

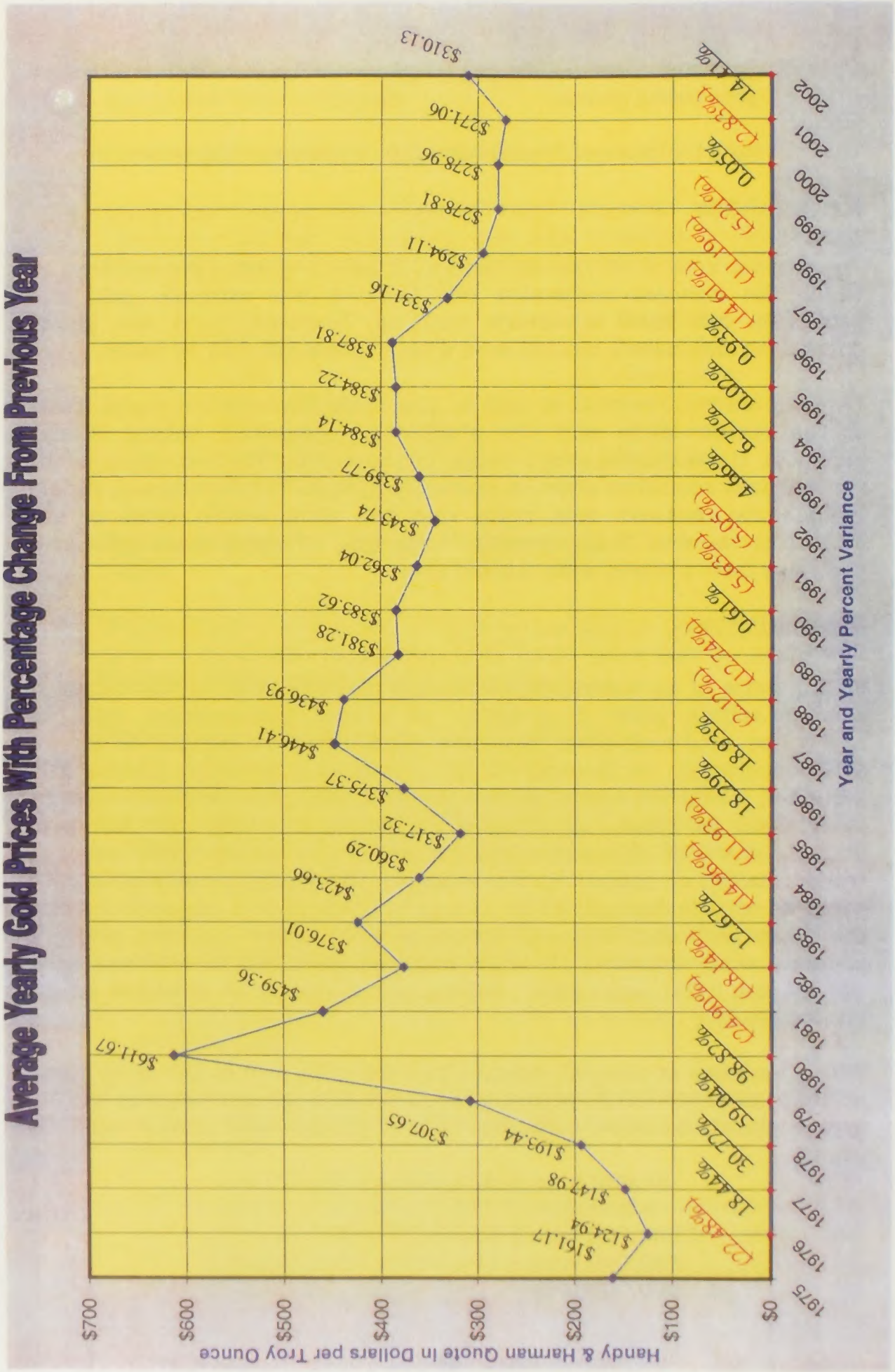


Table T-8 FOB Price List

Corporate Office
3500 American River Drive
Sacramento, CA 95864-5805
P.O. Box 15002
Sacramento, CA 95851-1002
(916) 484-3011 • FAX (916) 484-7012

TEICHERT AGGREGATES

Fiscal Year: 01/02
Effective Date: 09/17/01

TEICHERT AGGREGATES
COOL CAVE 165
2601 HIGHWAY 49
COOL CA 95614

CONCRETE AGGREGATES	CODE	PRICE	TN/YD	Stockpile
1" x #4	1003	$10.00	1.4	5
3/4" x #4	1004	$9.50	1.4	
1"Concrete Mix	1006	$12.75		
PROCESSED SAND				
Concrete Sand	1101	$9.75	1.6	8
SEAL COAT AGGREGATE				
1/2" x #4 SCA	1301	$9.75	1.4	6
3/8" x #4 SCA	1302	$9.75	1.4	7
5/16" x #8 SCA	1303	$10.00	1.4	15
AGGREGATE BASE				
3/4" AB Class I	1402	$8.75	1.5	4
1 1/2" AB Class II	1403	$7.75	1.5	18
3/4" AB Class II	1404	$8.00	1.5	9
1 1/2" spab (Special AB)	1405	$5.50	1.5	
MISC. PROCESSED AGGREGATE				
Bedding Sand	1702	$9.75	1.6	
1 1/2" Drain Rock	1704	$8.50		17
1 Ton Plus Boulders	1709	$16.00		13
1/4 Ton Plus Boulders	1714	$11.00		12
De-Icing Sand	1720	$9.75	1.6	8
4 " Drain Rock	1761	$9.00		2
4" & 6" Crusher Run	1762	$8.50		10
2"x 1/2" Limestone	1763	$13.00		3
Backing 1, 2 or 3	1764	$10.00		16
Facing & Light B	1765	$10.50		11

ALL MATERIALS SUBJECT TO AVAILABILITY
PRICES ARE QUOTED F.O.B. PLANT AND ARE SUBJECT TO CHANGE WITHOUT NOTICE
PRICES ARE BASED ON SCALE WEIGHTS WITH NO REDUCTION FOR MOISTURE
DISCOUNT: $.10 PER TON, PAYMENT 10TH PROX, PLUS APPLICABLE SALES TAX

74,785,000/1,000,000=74.78 or 75.00/ton

Product Specifications

Mineral products require specific specifications in order to be sold into a market. Even gold must be 99.9% pure. Nonmetallic minerals can be very difficult in regard to both physical and chemical specifications. For example, limestone may be sold as fillers, extenders, whiteners, cement admixture, and into chemical products. Limestone for these uses must meet ridged requirements. Not all limestone can. If it can, then beneficiation costs and market share plus the price of the finished product are critical to a marketability analysis. The mineral appraiser must check into product specifications thoroughly and carefully, particularly for nonmetallic minerals.

Market History

Describe and discuss the period when the commodity in question was sold in the market, as well as the distribution of sales price through the period. Graphic representation of the number of sales, volume of sales, or sales price through time periods must be presented in a concise, easily understood manner.

Market Supply and Demand

There is no question that MV is influenced by market supply and demand conditions. There must be a reasonable expectation or actual evidence that the mineral commodity in questions can be sold in the market place. This market may be local, statewide, nationwide, or worldwide. It is the job of the mineral appraiser to determine these market conditions and translate them into terms of how much material can be sold in unit and overall time periods. For example, a market that can absorb 1,000,000 tons of specialty limestone over a 10-year period at a rate of 100,000 tons per year is a good one presuming there are the necessary tons in the mineral deposit.

Market Entry

Indicate whether or not the commodity is being sold currently in the market. If so, support the sales with copies of sales receipts, and/or statements from buyers, witnesses, or information describing the findings of the mineral examiner. Where there are no current sales from

the deposit, market entry must be discussed by the mineral appraiser. Contracts or letters of agreement, assuring future purchases at a specified or market price are important documents to use in establishing future market entry. In the absence of any agreements, a mineral appraiser must make their own studies in relation to market entry. Estimates of the type of products, and the ability of the mineral products in question to be competitive, are of real concern. With no contracts or agreements, mineral appraisers must do their own research on market entry possibilities.

Extraction Rates, and Remaining Economic Life

These factors are important because the mineral appraiser must know if a proposal of a potential operator is reasonable for the mineral operation in question. If part of a proposal is not reasonable, the appraiser must try to talk with the mineral interests owner. If agreement cannot be reached, then the appraiser must use his technical judgment. Where an operation is ongoing, the mineral appraiser must understand technical aspects of these factors. All this attention is necessary because capital and operating costs must be obtained for inputs to the economic analysis.

Actual or projected tons and grade of materials are entered each year of production life. The recovered material is key and reflects the sales product after the recovery (waste) factor is applied. The production rate and the length of production time are based on market entry (share), amount of reserves, and waste factor. Mineral appraisers must determine to the best of their ability how much the recovered material is entering and can in the future enter the market place for sale. If the commodity is gold, the assumption is you can sell all you can produce. If the commodity is say, carbonate rock, all that can be sold annually by individual use must be determined through a study of past production records and/or a market entry study based on product specifications, demand, and market share. If material is not being sold, then future sales can be documented through contracts or letters of agreement assuring future purchases.

A reasonable extraction rate for the mineral operation must be determined. The extraction rate is mainly a function of market, reserves, waste factors, costs, ability to technically extract, and the amount of time over which extraction will take place. For most operations, no more than 20 years of productive life should be analyzed, because of the time value of mone. There must be sufficient reserves to last the time frame under consideration with the stipulated extraction rate. For example, if it is determined that there are 20 million tons of reserves

that can be extracted at a rate of 1 million tons per year, then there would be just enough reserves to last 20 years. However, if the extraction rate is increased due to market demand, then the economic life of the mineral operation will be reduced proportionately down, unless new reserves can be blocked out. New reserves can be blocked out depending on such things as operating and new capital costs, an increase in the selling price of the commodity extracted, and the actual occurrence of the commodity in question with the proper quality (tons and grade).

Income is the key here, and the economic or remaining economic life of a mineral operation for income generation is critical for the appraisal and must be examined or determined with great care, whether the appraisal is for a royalty rate or for a mineral deposit.

COMPONENTS FOR A DCF MODEL

Cash Flow (CF)

This is an analysis of actual or prospective net inflow/outflow of money that occurs during a specified time period. That is:

Gross Revenue (GR)
-- Operating expenses
-- Taxes
-- Capital costs
=Cash Flow

See Table T-6, p.44

Discounted Cash Flow (DCF)

As previously discussed, this is a method where a potential CF is discounted at a given discount rate (DR) over the time of the economic evaluation. The discounted values of the annual cash flows, usually no more than 20 years of productive mine life, are added cumulatively to obtain a net present value (NPV).

Discount Rate of Return (DR)

In valuing mineral properties, a discount rate is generally considered synonymous with these terms: cost of capital, opportunity costs of capital and minimum acceptable rate or return on investment. The rate if return is used to convert an income stream into value and should represent an acceptable rate of return to be realized on generally similar mineral property investment opportunities with reasonably similar risk

factors. Inherent in the concept is that a person or corporation, passed up an opportunity to invest in other similar mineral investment opportunities to invest in the property in question. Also, a high rate of return can be used to attract outside capital to a mineral investment.

Based on an investor's perception a market derived discount could have 4 major components:

1. Opportunity costs (funds for investment carry a cost related to a return those funds might have derived in another project)

2. Transaction costs (broker and investment banker fees, sales discounts, prospectuses and filing costs)

3. Estimated project risk entities (used by some; higher rate for higher risk)

4. Inflation rate (investors perception of future inflation)

We believe that risk entities do not reflect a measure of project risk by their placement as a percentage in the discount rate. Adjustment for the present value of money though time does not really include risk by simply making the rate higher (see section on Risk and Risk Factor). Also, an inflation rate should not be considered in a discount rate. We think that various escalation rates are more accurate than using a general overall rate for all products (see the sections on Inflation and Escalation and Escalation Rates). Finally, the incorporation of an inflation rate into the discount rate may not adequately account for depreciation. Depreciation is limited to the original purchase prices of items, and if these prices are not accounted for properly depreciation tax credits for future years will not be calculated correctly.

A true discount rate is the measure of the time value of money over the operating years of the economic analysis. The rate selected should be based on the anticipated (by the investor) annual future rate of return on the investment and, over the life of the project, represents both the anticipated return on the investment and the recapture of the investment itself. For an operating mine it is important to determine what rate of return has bee obtained for, say, the past five years and what is anticipated and appears reasonable for the mine operation to achieve in the future. Many DR from industrial mineral operations will reflect value added sales, so be careful, find out details, and work to a lower rate if necessary.

The determination of a proper DR for analysis of mineral investments is often difficult. There are a few direct sources of DR's available and rates for mineral investments of a 20-year term are generally lower than for short-term real property investments. Short-term investment rates, bonds, and so forth are not appropriate for the longer term of mineral investments. When possible mineral rates should be compared with mineral rates and obtained from mineral operations, bearing in mind that a rate may contain inflation, escalation, risk, transaction costs, or any combination of these items and do not reflect a true market rate.

Clearly, the best test for reasonableness of discount rate is comparison with rates in use by mineral producers. As challenging as this is to do, a concerted effort must be made by the mineral appraiser to obtain a rate that is reasonable and appropriate for the property in question. In this, there is no substitute for the personal knowledge and experience of the appraiser.

The discount rate must be obtained from and applied to F.O.B. product sales income, not value-added products or income. For example, sales of processed sand and gravel only are to be considered, not sales of asphalted concrete (oil added) or concrete aggregate (cement added). The rates will vary from commodity to commodity and are not interchangeable. The discount rate for sand and gravel will be lower than for high quality limestone or gold, because of lower initial capital investments and lower mining and processing costs.

Commodities will require different rates, as there are usually great differences in the processing costs, capital expenditures, and selling prices from which the rates are obtained.

As used here, the discount rate reflects an annual percentage rate of return on invested capital used to determine NPV. The rate discounts future cash flows to present worth.

A discounted cash flow (DCF) for each individual year of analysis can be calculated as follows:

$$PV = \frac{FV}{(1+DR)^t} + \frac{FV}{(1+DR)^{t+1}} + \frac{FV}{(1+DR)^{t+n}}$$

$$PV = \frac{1}{(1+DR)^t}$$

PV = Present Value ($)
FV = Future Value ($)
DR = Discount Rate
t = Time; mid year ½..1½..2 ½, or end of year,...1...2...3...,etc.

For example, say $1 at 12% (mid year)

$$PV = \frac{1}{(1+0.12)^{1/2}} = 0.9449,$$

and $1 at 12% (annual)

$$PV = \frac{1}{(1+0.12)1} = 0.8929$$

Internal Rate of Return (IRR)

A discount rate that will fix the NPV at zero is called an internal rate of return (IRR). If the rate of return is less than the discount rate used, then the mineral property may be a poor investment. Conversely, if the rate is greater than the discount rate used, the investment should be a good investment. It is important to note that a zero IRR does not mean that there was zero return on the investment, but rather that percentage of return was equal to the discounted rate.

Inflation and Inflation Rate (IR)

Inflation refers to the decline in value of money (price or value of "basket of goods" items) as measured by what it will buy. Generally measured by Consumer price Indexes (CPI) published monthly and yearly by the U.S. Bureau of Labor Statistics. Inflation is in dimensionless numbers, but expressed as a percentage rate. This index is developed by examination of costs of "basket of goods" items. Price increases alone do not mean that inflation occurs because the price increase may be accompanied by an increase in productivity. Productivity increase is possible with some mineral operations that are able to conserve, consume less, or use low cost substitutes, but overall the CPI does not reflect these concepts.

Escalation and Escalation Rate (ER)

Escalation refers to a change in price or value through time (annual basis) for specific items such as selling prices of minerals, operating costs, non-depreciable and depreciable capital costs, and royalty rates that do not rise or fall at the same percentage rate. Because these prices and costs rise at different rates, a DCF or other economic analysis should not be influenced by a single overall rate of inflation. Product

mined, selling prices, operating costs, and depreciable and non depreciable capital costs, should be escalated at different rates in order to reflect the differences reduce risk, and make economic analysis closer to the truth (see Table T-6).

Mining and milling and other Costs Indices (CI) of the U.S. Department of Labor Statistics and actual history of mineral operations can be used to determine different escalation rates for DCF analysis.

Different (historic) escalation rates in percent can be computed from the last 5 years of different CI. For example, say the Mine Labor Index for 1997 is 16.17 and for 2002 is 17.17 the expenditure is $100,000.

$$\text{So } \$100{,}000 \times \frac{17.77}{16.17} = \$109{,}895$$

the average annual increase is:

17.77 - 16.17= 1.60, and

1.60/16.17 = 0.099 or 9.9% and,

9.9%/5 yrs. = 1.98%;

or, 1.60/5 yrs. = 0.32, and 0.32/16.17 = 0.0198 or 1.98%;

or (109,895 - 100,000)/$100,000 = 0.0981/5 yrs. = 0.0198 or 1.98%

From the different indices for different subjects from 1988 to 1992 an average percentage rate increase can be calculated for each different cost. These percentages are considered the escalation rates.

These percentage rates are then used to determine escalated dollars for each cost to be escalated by the following formula:

$A = FV(1+E)^t$

FV = Future Value ($)
E = Escalation Rate (%) - decimal
t = Time (years)
A = Adjusted Rate (%) - decimal

For example, a selling price of $5.00 per ton escalated at 2.0% for 20 years is:

$$A = \$5.00\ (1 + 0.020)^{20} = \$7.43$$

Products sold, and their selling prices are best derived through examination of the past 5 years of sales receipts from the mining company in question. If a deposit is not in production, then the industry experience of the mineral appraiser is vital for developing a reasonable escalation rate.

Remember an escalation or inflation rate should not be included in the DR. Many market DR do have an inflation or escalation component factored in, so be careful in comparing " market " rates as they may be too high. If future costs are not escalated appropriately, future depreciation tax credits will not be right.

Risk and Risk Factor (R,RF)

Risk refers to the possibility of not receiving the amount of anticipated income and/or cash flow during the productive life of a mineral operation and/or experiencing long delays in lead-time to first production. There are three broad categories of risk in mining; financial political and technical. Several situations can lead to problems. Some of the more common concepts that should be considered in deriving a risk factor are:

- Significant grade variability of reserves causing lower income and/or higher operating costs to control mill or processing feed.

- Amount of reserves less than anticipated resulting in premature mine shutdown.

- Extensive variance in milling and/or processing techniques needed to account for proper recovery of complex or impurity-bearing mineral materials causing higher than anticipated operation costs.

- Loss of ability to maintain production rate, and/or to sell products into a competitive marketplace at anticipated prices resulting in a significant or total loss of market share.

- Untimely completion of projects with available depreciable capital resulting in missed deadlines and, eventually, loss of income.

- Unusual increases in mining costs, particularly energy costs.

- Planning, bonding, and permitting (environmental and reclamation) problems causing delay in mineral operation startup and/or delays during operating life. This results in delay of initial

income, or reduction of income over operating life of the mineral operation.

To assign a quantitative and objective factor for risk is not possible. Nevertheless, a risk factor of some kind should be assigned to a mineral operation. Experience and managerial judgment of the company in question and the experience and judgment of the mineral appraiser are critical to approximate a risk factor. The first few years of any operation are usually the most critical and risky.

A percentage risk factor is applied to the NPV in this system. Risk is not factored into the discount rate, because risk is not really part of the market rate nor reflected adequately through the future value of money. Here, it is reasoned that risk adjustment can be more adequately accounted for, by use of appropriate escalation factors, careful analysis of start-up times for new operations and the resulting income generation, plus the reducing the NPV by a reasoned percentage factor.

Net Present Value (NPV)

The sum of the present values of all future years cash flows over the economic life of a mineral property, (usually no more than 20 years) after being discounted at a specified discount rate is the NPV. The NPV takes into account the earning power of money over time. It is an indicator of the FMV of a mineral property for its projected life with a specified rate of return on investment. A positive value means that invested money will earn a higher rate of return than that indicated by the discount rate. If the value is zero the invested money will earn a rate of return equal to the discount rate. If the value is negative, then invested money will earn les than that indicated by the discount rate.

Costs and Salvage Value

Sources of cost data other than knowledge and experience of the mineral appraiser are: Mining Costs Service, Engineering and Mining Journal, Mining Engineering, Pit and Quarry, Rock Products, My Little Salesmen, and manufacturers and sellers of mining equipment.

Operating Costs (OC)

OC are costs in the year incurred, but escalated for future use on an annual basis. Examples of operating costs are:

- Labor (union or otherwise) and management wages;
- Maintenance and standby
- Vehicle maintenance;
- Payroll and sales taxes;
- Vacation and holiday;
- Workman comp. insurance;
- Employee benefits
- Overhead;
- Fuel (diesel or other);
- Power;
- Contract stripping;
- Contract tracking;
- Packaging costs, labor, bags, and so forth
- Supplies and small tools;
- Blasting;
- Equipment rental;
- Insurance;
- Repair and maintenance (plant, ground);
- Repair and maintenance (equipment);
- Advertising and sales;
- Bad debts;
- Dues and subscriptions;
- Office supplies;
- Outside services;
- Legal and audit;
- Licenses;
- Travel and entertainment;
- Telephone;
- Utilities;
- Vehicle gas and tires;
- Stripping and ground shaping;
- Processing plant fee (per ton);
- Reclamation and environmental;
- Reagents, and;
- Miscellaneous.

Capital Costs(CC)

CC are costs related to cost of acquisition or development of capital assets.

Working Capital Costs (WCC)

WCC are costs necessary to operate a mineral operation initially until income is received. Such costs may be for acquiring inventories of goods

and supplies, day to day expenses, a supply of cash for emergencies, and so forth. These costs cannot be expensed, depreciated, amortized, or depleted until items are placed into service or used. For our analysis these costs usually are considered sunk, even though when a mine goes into production, these costs could be recovered eventually over time. Sunk Costs represent money spent in the past with no likelihood of recovering them. If a mineral operation is on stream, working capital costs are generally not figured.

Depreciable Capital Costs (DCC)

DCC are for tangible property of mining, milling, processing equipment, buildings, other equipment such as vehicles, and so forth. They are escalated for future use on an annual basis. These costs are depreciable for tax purposes and must meet the following requirements:

1) Be used in mine operation for income generation.

2) Have determinable useful life and that life must exceed one year

3) Be an item that wears out, is used up, becomes obsolete, or loses value from natural causes.

4) Be placed in service in a usable condition.

Over time, many of these costs are depreciated on a modified Accelerated Cost Recovery System (MACRS) schedule. These costs should be escalated on an annual basis. For a mineral operation that has been ongoing for some years, it is important to determine how much of these costs (and non-depreciable costs) have been paid off at the time period of the economic evaluation. Items paid off should not be recosted in the economic program. Enter into the economic flow as it exists during the examination to reflect the actual, current situation.

Non-depreciable Capital Costs (NDC)

NDC are for such items as environmental and reclamation cost, bonding, mobilization costs for contract mining, and exploration and development costs. They can be escalated for future use on an annual basis.

Exploration Costs (EC)

EC are expenditures required to show the existence, extent, quantity, or quality of a new mineral deposit. Costs may include core drilling, sampling, assaying, engineering, geological mapping geophysical or geochemical studies, and so forth. For our work, expense in full in the

year spent by individual taxpayers. For corporations, expense 70% in year spent, and amortize 30% straight line over 60 months. If mining a venture is unsuccessful, and abandoned, costs remain a deduction, but, if the venture is successful, expensed deductions must be recaptured. For our work, restore costs to expensed fraction by charging it as income. NOTE: capital equipment or improvements used for exploration are not exploration costs if those costs are recoverable through depreciation. Also, acquisition costs are not considered exploration costs.

Development Costs (DC)

DC are expenditures made after the determination that a mineralized body is economically viable and the decision made to develop that body. These costs include overburden removal, underground development, bulk sampling, development drilling and other costs, but only after a decision is made to develop the mine. An individual taxpayer can deduct 100% of costs in the year incurred, but corporations must deduct only 70% of the cost in the year incurred and amortize 30% of the costs straight line over 60 months. Costs are to be recaptured. Development costs end when mine is in full production, and become operating costs.

Salvage Value (SV)

SV is the value of any property at the end of its useful life through sale or disposition.

Mineral Tax Framework and Calculation

Federal Tax – General

The following discussion is to provide an overview of federal taxation as it applies to the mining industry. The amount of detail herein provided should be sufficient for engineering feasibility studies. The information is also sufficient for the purpose of this book, the determination of Market Value (MV) by the use of a discounted cash flow (DCF). It is to be understood, however, that the following narrative is insufficient for the calculation of a tax liability.

Federal Tax – Calculation

Usually, the corporate federal income tax is based on the computation of a regular income tax approach, using standard tax rules, subtracting all allowable operating expenses, overhead, depreciation, amortization, and depletion from the total current year revenues. Deductions for exploration and development are either expensed or amortized.

A second federal corporate tax, the Alternative Minimum Tax (AMT) is calculated in three steps:

1. Regular taxable income is adjusted by recalculating certain regular tax deductions, based on AMT laws, to arrive at an Alternative Minimum Tax Income (AMTI).

2. The AMTI is then multiplied by 20% to determine the Tentative Minimum Tax (TMT).

3. If the TMT exceeds the regular income tax, the excess is the AMT amount, payable at year-end, in addition to the regular tax liability. (Gosling, B.B., Western Mining Engineering, 2002)

Pertinent Tax Law Changes Since 1991

(Gosling, B. B., 2002, and Thompson, S. A., 2003)

1. The highest effective corporate tax rate was increased from 34% to 35%. This rate applies to corporations with taxable income of greater than $18,333,333.

2. The Adjusted Current Earnings (ACE) depreciation adjustment on new assets was eliminated.

3. Most new intangible assets, including goodwill, are now amortizable over a 15-year period.

4. The regular tax recovery period for new real property was increased to 39 years, which is essential equivalent to the 40-year period for the minimum alternative tax.

5. Pollution equipment placed in new plants is no longer amortizable under a special schedule. It is now treated as any other type of mine or mill equipment.

6. The limit for expensing tangible personal property purchased in a single year was increased from $10,000 to $17,500.

7. The Environmental Tax was repealed in 1996.

8. When a new business is formed, a business entity is created. Certain entities must be corporations (for example, banks

and insurance company). Unless it makes an election to the contrary, any domestic entity formed after 1996, by two or more members, is, by default, treated as a partnership; any entity with a single owner is disregarded as an entity with a single owner separate from its owner (that is, treated as a sole proprietorship).

a) A sole proprietorship is the simplest form of business organization. This form of business has no existence apart from you, the owner. Its liabilities are your personal liabilities, and your ownership (proprietary) interest ends when you die. You undertake the risks to the extent of all your assets, whether used in the business or used personally.

b) If a business (sole proprietorship) has not made a profit in 3 of the last 5 years, the IRS may question if this is really a trade or business for profit, or is it merely a "hobby." If it is deemed a "hobby," the IRS will not allow losses to offset other income.

Basic Tax Definitions

(Gentry and O'Neil, 1984,)

1. Revenue: Total income derived from product sale

2. Deduction: An amount deducted from revenue to arrive at taxable income.

3. Taxable Income: The amount on which a tax is calculated

4. Amortization: Any deduction, other than depreciation or depletion, allowed over a period of years.

5. Expense: An expenditure treated as a deduction in the year it is made.

6. Defer: To save an expenditure treated for deduction in one or more later years.

7. Book (non-cash) Deduction: Refers to a recovery of costs in before-tax-dollars through deductions over time, for example, depletion, amortization, and net loss carried forward.

8. Capitalize: To establish an account for an expenditure which, depending on the type of expenditure, may or may not qualify as a deduction.

9. Capitalized Cost: A cost that is not deducted in the year incurred, but is spread out through a period of years by depletion, depreciation or amortization deductions.

10. Recapture: The act of forgiving a deduction until some amount of money is recouped. Recapture is generally associated with an amount of money which was previously expensed, but should have been capitalized.

11. Basis: The amount in a capitalized account at any point in time. The original basis is generally the cost of an asset.

12. Expenditure: An outflow of money for the purchase of goods or services. The three types of expenditures, for tax purposes, are;

    1. Expenditures for items that are consumed in one year and are non-recoverable. These expenditures can be expensed, resulting in a deduction of full amount in the year of expenditure (e.g., operating labor, supplies, power, lubricants, etc.)

    2. Expenditures for assets which are consumed more gradually and are non-recoverable. These expenditures can be capitalized with a fraction of the expenditure treated as a deduction annually over the life of the asset (e.g., mining equipment, buildings, etc.).

    3. Expenditures for assets which are not consumed and are recoverable after the end of the project. These expenditures are considered recoverable and no deduction is allowed on them over the life of the project (e.g., land).

Depreciation (DP)

Depreciation represents the concept that certain income producing assets do not last, but wear out over time. Therefore, a part of the asset cost can be a tax allowance, over time, beginning when the asset is placed in service. The Modified Accelerated Cost Recovery System (MACRS) is used nearly always in the analysis. Capital Cost type equipment (new or used) for mining ventures than can be depreciated

include mining, milling, and processing facilities, vehicles, buildings, furniture, etc (see IRS Publication 946).

Remember that for items to be depreciable:

1. It must be used in a business or for production of income.
2. It must have a determinable life, greater than 1 year.
3. It must be something that wears out or becomes obsolete.

The following schedule shows the MACRS depreciation percentage rates:

MACRS Depreciation Percentage for Half-Year Convention, 200% Declining Balance

	Recovery Period		
Year	3-Year	5-Year	7-Year
1	33.33%	20.00%	14.29%
2	44.45%	32.00%	24.49%
3	14.81%*	19.20%	17.49%
4	7.41%*	11.52%*	12.49%
5		11.52%*	8.93%*
6		5.76%*	8.92%*
7			8.93%*
8			4.46%*

(*the straight-line depreciation method is used in these years, IRS 534)

Recovery Periods for Some Depreciable Assets

(GDS=general depreciation schedule, ADS=alternative depreciation schedule--rarely used for mining operations).

	Recovery Period (Yrs.)	
Items	GDS	ADS
Special Tools for manufacture of fabricated metal & finished plastic products	3	3.5
Semi-tractor units	3	4.0
Computers, related peripheral equipment	5	5.0
General purpose trucks and automobiles	5	5.0
Trailers and Trailer-mounted containers	5	6.0
Office furniture and fixtures	7	10.0
Mining machinery (loaders, dozers, drills, Scrappers, haul trucks, conveyors, etc. beneficiation Equipment	7	10.0

Equipment to manufacture metal products	7	12.0
Equipment to manufacture steel mill products	7	15.0
Commercial buildings and structures	39	40.0

Note: Mining-building structures are depreciated in a straight-line schedule over either the 39 or 40-year period.

Depletion (DPL)

Depletion is used for mineral extraction analysis because minerals for federal tax purposes, are considered wasting assets. A gradual reduction of the original amount of minerals by extraction and sales through time is then considered depletion. Theoretically, the depletion allowance will return the value basis of the original mineral deposit. Depletion is figured by two methods; one is by cost and the other is by percentage. Taxpayers should use both methods, then select the method that shows the most deduction. In our analysis, Percentages Depletion is mostly used. It is figured as a specified percentage (by mineral commodity group) of gross income after royalty payments for the sales of minerals during the tax year. However, the deduction for depletion cannot exceed 50% of the taxable income after all deductions except depletion and loss carried forward deductions (100% for oil and gas). If the 50% value is exceeded, use the 50% value. The following schedule shows the allowable percentage depletion for solid minerals.

Allowable Percentages for Percentage Depletion of Solid Minerals:
(From IRS service Publication 535)

22% Sulphur, uranium, if from deposits in the U.S., asbestos, mica, nickel antimony, molybdenum, tin, tungsten, mercury, vanadium, lead, zinc, manganese, platinum, and platinum group metals, rutile, talc, beryllium, and titanium, along with certain other minerals including bauxite.

15% Gold, silver, copper, and iron ore, if from deposits in the U.S.

14% Vermiculite, specialty clays and most other metals not covered in the 22% and 15% rates.

10% Asbestos (if from deposits outside of the U.S.), brucite, coal, lignite, perlite, sodium chloride and wollastonite. Note, the corporate deductible depletion allowance for iron and coal is reduced by 20% of the excess of the otherwise allowable percentage depletion, over the remaining adjusted basis of the

property as determined at the end of the tax year and without regard to the depletion deduction for the year.

7.5% Clay and shale used or sold for use in making sewer pipe or bricks, and clay, shale and slate used or sold for use in sintered or burned lightweight aggregates.

5% Gravel, sand, and stone.

State Taxation Methods

(Gosling, B.B., 2002)

State taxes, applicable to mining/mineral extraction, are generally of four types:

1. Corporate Income Tax – Generally calculated as a percentage of the net taxable income (Federal). Certain modifications are used, such as, the calculation of depletion allowances and the permitting or not permitting the deduction for Federal income taxes paid.

2. Property Taxes – Normally, a State establishes an assessment ratio or proportion of the true value against which the tax rates apply. The tax rates are established by municipalities and counties and vary throughout the State with a maximum rate having been established by the State. Usually, the amount of property tax to be paid is calculated by multiplying the value of the property by the assessment ratio to determine the assessed valuation. The assessed valuation is then multiplied by the tax rate to determine the tax to be paid.

3. Sales and Use Taxes – Some States impose a tax on the sale of services, equipment, tools, supplies, and other personal property. This is a use tax and is usually applied to property purchased out of State and has the same effect as a sales tax on purchases made within the State

4. Most States impose some type of tax on mine production or income. The taxes are called severance taxes, mine license taxes, proceeds of mine taxes, business or occupation taxes, or excise taxes. These taxes are usually a percentage of net or gross income, or fixed amount per ton of production. For example, Nevada has a Proceeds of Mineral tax that applies instead of a State Corporate tax, and is on the net proceeds of the minerals, not to exceed 5%.

California's property taxes are ad valorem ("at value"). Depletion and local taxes are deductible but State and Federal taxes are not. This makes it difficult to use actual figures for input into a DCF analysis unless actual company figures are used. In practice, it is not unreasonable to use 1% of the net revenue on an annual basis.

Of note, a MV determination on mineral operations before taxes is improper. The tax framework is critical and must be considered fully as the tax calculation can drive an apparent profitable operation into one with a negative cash flow.

State and Federal Income Taxes-Computations

Full State and Federal Income Taxes in California can be computed together by the following:

S = State Tax, CA = 9.3%
F= = Federal Tax = 34.0% (or 35.0%)

S+F (1-S) = 0.93+0.34 (or 0.35)(1-0.093) = 0.3927% (39.27%) or 0.4018 (40.18%)

Individual Income Tax

Individual Income Tax must be calculated on an individual basis.

Summary Considerations

- Many mineral operations on Federal lands are large corporate ventures requiring the use of corporate tax frameworks rather than individual tax frameworks.

- Consideration should be given to expensed (deducted fully in year incurred) and capitalized (not taken in year incurred and over more than one year) costs, loan interests, amortization concepts, and any loss carried forward. Some pre-production costs may have to be sunk. Mobile equipment depreciation costs are recovered by using 7-year MACRS property.

- Depletion allowance benefits are usually recovered by percentage depletion at the appropriate percent of net revenue from commodity sales. The deduction for depletion cannot exceed 50 percent of the taxable income after all deductions, except depletion

and deduction for net operating loss carried forward. Where the depletion allowance exceeds the 50 percent limit, the 50 percent figure is used.

- State and/or county tax frameworks vary and must be accounted for adequately. California property taxes are Ad Valorem making an actual figure impossible to use as an input to the DCF unless actual data from company records can be used. Therefore, these taxes are estimated at one percent of the net revenue on an annual basis. Available tax records are vital to insure accuracy.

- Mineral tax framework items must be accounted for in mineral appraisals. Where an operation is ongoing, the actual tax framework elements can be used as a guide to help determine value, even though the purchaser may have a different tax framework. Where there is no operation, but one is feasible, the mineral appraiser should generally use full rates in consideration for tax framework items. The tax framework is of major importance and must be considered fully, for it can drive an apparent profitable operation into one with a negative cash flow.

Some Special Considerations

Consider first a proponent of a land exchange with an actual and permitted mineral operation doing business on, or adjacent to the property in question. The proponent may be mining on mining claims on the property, mining on privately owned land adjacent to the property, or possible have a long term mineral material sales contract with the BLM. Key to this example is that the proponent has mineral rights to the exclusion of others. The best way to appraise this operation is for the proponent and not as if the property is on the open market. Therefore, consider sunk permitting costs and the capital cost situation for building and equipment items that already are in existence. In short, consider the whole situation at the time of appraisal, except for the sell-out value of existing items such as mining and processing equipment, already sunk capital costs, environmental, reclamation, permitting costs, and so forth. Second, consider a property that is not developed and the proponent do not have mineral rights, or has not exercised his rights for development of the property, and no capital has been expended. The best way to appraise MV here is as if the property was on the open market. Therefore, all permitting environmental, reclamation and capital cost should be factored into the analysis. These costs as well as operating costs, market entry, amount and quality of reserves, percentage rate of return, tax structure, and so forth must be modeled up as well as possible by the appraiser. However, sell-out value of appropriate

equipment is not considered. Third, consider that data not generated by an appraiser must be fully described, and in addition, how that data was verified.

Conclusions

Strong technical abilities are required in order to assemble the specialized data in geologic, engineering, and economic areas that are needed for mineral appraisals. Skills in these fields are absolutely necessary for the mineral appraiser. Those skills not in hand must be developed. Mineral appraisal is a specialty business and those appraisers not knowledgeable in technical, legal, and economic concepts reading minerals should not make mineral appraisals.

Much data and experience are required in order to be reasonably accurate. Sometimes, appraisers must simply do the best they can with available data and experience and enhance the risk factors through admission of the inadequacies of the database. Even so, these methods can be realistic and in line with the majority of industry makes economic evaluation investment decisions for deposit purchases or sales.

ABBREVIATED APPROACHES TO MV FOR MINERAL INTERESTS

There are six situations that do not require comprehensive economic analysis. If obviously applicable, or if by preliminary inspection, the mineral appraiser thinks one or more of these situations could apply, they should be tried before beginning any comprehensive economic analysis. If any of these situations exist, then there is zero MV.

These situations are as follows:

1. WHERE NO MINERALS EXIST, OR THEY EXIST IN SUCH LOW QUANTITIES THAT IT IS OBVIOUS THAT NO ECONOMIC ANALYSIS ARE NEEDED.

   One example of the situation would be a property where platinum group elements are reported by a claimant, but none can be found by using appropriate analytical techniques. Another example would be a situation where appropriate types and numbers of assays of gold show 0.001 ounces per ton.

2. WHERE MINERALS EXIST, BUT CANNOT MEET SPECIFICATIONS FOR THE MARKET.

An example would be a dolomitic and siliceous carbonate rock that is said to be salable for specialty limestone products, but the iron, magnesium, and silica content are too great to beneficiate economically. Another example is common clay that will not meet the physical and chemical properties required by specialty clays.

3. WHERE CAPITAL COSTS ON AN UNDEVELOPED PROPERTY EXCEED THE PROJECTED GROSS REVENUE.

An example would be a mineral property with X tons of total minerals at Y grade and Z recovery rate that cannot provide sufficient gross revenue from sales to cover the required cost of capital for placing the property into production. Consider a property that has 400,000 tons of complexed gold-bearing material at an average grade of 0.020 ounces per ton with a recovery rate of 80 percent. Here, gross income from sales is:

(400,000 tons) x (0.020 oz./ton) = 8,000 oz.

(8,000 oz.) x (0.80) = 6,400 oz., and

(6,400 oz.) x ($340/oz.) = $2,176,000.

Say, projected capital costs for permitting, mining and processing, equipment, building, leach pad construction, and so forth are about $3,700,000. Although a good part of the capital costs eventually may be depreciable over a seven year term after any amount of delay in start-up, tax credit delays plus necessary operating costs and replacement capital costs will be too great and insufficient for a viable economic operation.

4. WHERE OPERATING COSTS EXCEED PROJECTED GROSS REVENUE.

If operating costs on an undeveloped mineral property, or a property in operation, exceed gross revenue, then the property or operation is not economically viable. For example, where operating costs per ton are $100 and projected or actual income from sales is $90 a ton, you have an economic loser.

5. WHERE MARKET ENTRY CANNOT BE ACHIEVED.

An unfortunate situation can arise when dealing with some nonmetallic mineral deposits. Consider a suitable gypsum deposit in regards to tonnage and grade. It may not be currently economically viable, because the market sales area is too far away,

or locally saturated and entry cannot be made without losing money.

Market entry capability may be obvious, but not always. It may be necessary to perform detailed work on market entry capabilities, because the lowest economic level of f.o.b. sales prices may not be known without full DCF analysis. It is possible that new product specifications will require too large a beneficiation cost to bring the deposit on line economically.

6. WHERE MINERAL EXTRACTION WILL NOT BE PERMITTED.

If the land in question will be, or is withdrawn or zoned from mineral entry by governmental agencies, then mining is not permitted and there is no MV for mineral interests. If stipulations are made by the agencies involved, permitting mineral extraction after transfer of ownership, as in an exchange, then it is possible to determine the MV, or a reasonable royalty rate.

MINERAL APPRAISAL REPORTS

GENERAL

A mineral appraisal report by a qualified mineral appraiser should contain the written and graphic presentations of findings made during office research, laboratory testing, and field examination of a mineral deposit or operation. It should include appraiser certification, assumptions and limiting conditions, scope and purpose documentary text, economic data and analysis, illustrations, testing results, interpretations, recommendations, and conclusions concerning the appraisal. Reports should be complete and accurate, prepared in a clear and concise manner, and appropriate in tone. Thought and care must be given to the preparation of the report so it will convey to others the impression of competency based on accepted professional standards and compliance with current policies and legal interpretations of the Department of the Interior.

REPORT CHECKS

- Complete?
  a. Does it give all necessary information?
  b. Does it answer all questions the reader may raise?

- Concise?
  a. Does it contain only essential facts?
  b. Does it include only essential words and phrases?

- Clear?
  a. Is the language adapted to the readers and are the words the simplest that carry the thought?
  b. Do the words exactly express the thought?
  c. Is the sentence structure clear, and the sentence short?
  d. Does the paragraph contain only one main idea?
  e. Are these ideas presented in the best order, and in as few words as possible?

- Correct?
  a. Is the information accurate?
  b. Do the statements conform with laws and regulations?
  c. Is the writing free from grammatical errors?

- Appropriate in tone?
  a. Will the tone bring the desired response?
  b. Is the writing free from words that may arouse antagonism?
  c. Is it free from jargon and legalistic phrases?
  d. Is the active rather than passive "voice" used?

- Are your methods of investigation fully and clearly described and compatible with acceptable professional practice?

- Are the conclusions adequate to the data?

- Is the purpose of the report clearly stated?

- Is your report well organized?

- Are illustrations pertinent, legible, and adequate?

- Are the Summary, Conclusions, and Recommendation sections appropriate and effective?

REPORT GOALS AND STANDARDS

The following directives are from 43 CFR 2201.3-2 and –3. They are for exchanges, but have general application.

2201. 3-2 Market Value.

(a) In estimating market value, the appraise shall:

(1) Determine the highest and best use of the property to be appraised;

(2) Estimate the value of the lands and interests as if in private ownership and available for sale in the open market;

(3) Include historic, wildlife, recreation, wilderness, scenic, cultural, or other resource values or amenities that are reflected in prices paid for similar properties in competitive market;

(4) Consider the contributory value of any interest in land such as minerals, water rights, or timber to the extent they are consistent with the highest and best use of the property; and

(5) Estimate separately, if stipulated in the agreement to initiate in accordance with 2201.1 of this part, the value of each property optioned or acquired from multiple ownerships by the non-Federal party for purposes of exchange, pursuant to 2201.1-1 of this part. In this case, the appraiser shall estimate the value of the Federal and non-Federal properties in a similar manner.

(b)In estimating market value, the appraiser may not independently addthe separate values of the fractional interests to be conveyed, unless market evidence indicates the following:

(1) The various interest contribute their full value (pro rate) to the value of the whole; and

(2) The valuation is compatible with the highest and best use of the property.

(c) In the absence of current market information reliably supporting value, the authorized officer may use other acceptable and commonly recognized methods to determine market value.

2201.3-3 Appraisal report standards

Appraisals prepared for exchange purposes shall contain, at a minimum, the following information:

(a) A summary of facts and conclusions;

(b) The purpose and/or the function of the appraisal, a definition of the estate being appraised, and a statement of the assumptions and limiting conditions affecting the appraisal assignment, if any;

(c) An explanation of the extent of the appraiser's research and actions taken to collect and confirm information relied up on in estimating value;

(d) An adequate description of the physical characteristics of the lands being appraised; a statement of all encumbrances; title information, location, zoning, and present use; and analysis of highest and best use; and at least a 5-year sales history of the property;

(e) A disclosure of any condition that is observed during the inspection of the property or becomes known to the appraiser through normal research that would lead the appraiser to believe that hazardous substances may be present on the property being appraised;

(f) A comparative market analysis and, if more than one method of valuation is used, an analysis and reconciliation of the methods used to support the appraiser's estimate of value;

(g) A description of comparable sales, including a description of all relevant physical, legal, and economic factors such as party to the transaction, source and method of financing, effect of any favorable financing on sale price, and verification by a party involved in the transaction;

(h) An estimate of market value;

(i) The effective date of valuation, date of appraisal, signature, and certification of the appraiser;

(j) A certification by the appraiser signing the report to the following:

(1) The appraiser personally contacted the property owner or designated representative and offered the owner an opportunity to be present during inspection of the property;
(2) The appraiser personally examined the subject property and all comparable sale properties relied upon in the report;
(3) The appraiser has no present or prospective interest in the appraised property; and
(4) The appraiser has not, and will not, receive compensation that was contingent on the analysis, opinions, or conclusions contained in the appraisal report; and

(k) Copies of relevant written reports, studies, or summary conclusions prepared by others in association with the appraisal assignment that were relied upon the appraiser to estimate value, which may include but

is not limited to current title reports, mineral reports, or timber cruises prepared by qualified specialists.

REPORT FORMAT

No one format will do for all appraisal reports, but there are many items that should be in all reports. A sample format along with some essential sections for a report are shown in Tables T-9 , p. 79-82, and T-10, p.83-85.

REPORT REVIEW

Introduction

A qualified technical reviewer should see that reports are objective, complete, accurate, and clearly and concisely prepared. Thought, care, and hard work must be given to the preparation of a report. In addition, a reviewer must see that this impression of competency is based on accepted professional standards and insure that the report complies with legal and technical standards, guidance, and procedures. They should insure that the author communicates effectively and in an appropriate tone to the reader.

Goals

Broadly, the goals of a technical reviewer are to assure that:

- Purpose of the report is clearly stated and accomplished.
- Assumptions and limiting conditions are given adequately.
- Certification and qualifications of the mineral appraiser are given.
- Legal, technical, and economic date is accurate, adequate, supports the conclusions and appraised value.
- All supporting documents are included.
- Illustrations, attachments, and tables are appropriate and complete.
- Extraneous material is removed.

Table T-9 Mineral Report Format and Sections
(Title Page, Mineral Appraisal Report)

Serial Number
CA 20050

UNITED STATES
DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

MINERAL APPRAISAL REPORT

Mineral Appraisal For The BLM Rocky Canyon 80-Acre Exchange Parcel San Luis Obispo County, California

LANDS INVOLVED

Mount Diablo Base and Meridian

Township 28 S., Range 13 E.
Section 19, E½SE¼

Prepared by

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Gregg Wilkerson, District Geologist, CA-015

Date

January 24, 1992

Technical Approval	Management Acknowledgement
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Robert M. Woodward	Glenn A. Carpenter
(Signature)	(Signature)
Geologist	Area Manager
(Title)	(Title)
Feb 19, 1992	MAR 06 1992
(Date)	(Date)

BUREAU OF LAND MANAGEMENT · MINERAL EXAMINER · Robert M. Woodward · 015 · DEPARTMENT OF THE INTERIOR

TABLE OF CONTENTS

	Page
GENERAL ASSUMPTIONS AND LIMITING CONDITIONS	1
CERTIFICATION BY MINERAL APPRAISER	2
SUMMARY AND APPRAISED VALUE	3
INTRODUCTION	4
Location	4
Purpose aod Scope of Report	4
Field Examinations and Cooferences	6
PHYSICAL FEATURES AND IMPROVEMENTS	6
General	6
Physiography	6
Climate aod Vegetation	6
Surface Improvements	6
Water, Power and Other Utilities	6
LAND STATUS, USE AND ACCESS	7
Land Status and Use	7
BLM Land	7
Private Land	7
Access	13
Alquist-Priolo Active Fault Zones	13
GENERAL GEOLOGY AND MINING HISTORY	13
General Geology	13
Mining History	13
SITE GEOLOGY, RESERVES, AND FUTURE PRODUCTION	15
Geology	15
Drilliog Results	15
Reserves and Future Production	18
MINING, PROCESSING AND PRODUCTION; UAI OPERATION	29
Mining	29
Removal of Overburden	29
Drilling and Blasting	29
Haulage	29
Processing	29
Primary Crushing	29
Surge Piles	32
Secondary Crushiog and Screening	32
Wash Plaots	32
Stockpiling and Distribution	32
Equipment	32
Specifications	32
Past Productioo of UnionAsphalt, Inc.	33
RECLAMATION AND ENVIRONMENTAL CONSIDERATIONS	33
ECONOMIC EVALUATION AND MINERAL APPRAISAL	33
Brief History of Activity in Rocky Caoyon	33
Highest aod Best Use Analysis	33
Approach to Fair Market Value (FMV)	35
Cost Approach to FMV	36
Sales Approach to FMV	37
Prior Sale of Identical Property Approach to FMV	37
Comparable Sales Approach to FMV	37
Royalty Income Approach to FMV	37
Discouoted Cash Flow (DCF) Income Approach to FMV	39
MINERAL APPRAISAL	41
Assumptioos	41
Discouoted Cash Flow (DCF) Model	42
Product Mined, Grade, Recovery Factor and Recovered Material	42
Selling Price through Net Revenue	42
Operating Costs	46
Tax Concepts and Calculations	47
Net Income and Operating Cash Flow	47
Operating Cash Flow Through Cash Flow	47
Discount Rate Factors, DCF, and Cumulative DCF	48
Inflation, and Escalation Rates	48
Discount Rate	54
Risk Aoalysis	55
Appraised Value	56
SELECTED REFERENCES	57

ILLUSTRATIONS

Maps

		Page
M-1	Location Map	5
M-2	BLM Master Title Plat for T. 28 S., R. 13 E., MDM	8
M-3	Township Plat for T. 28 S., R. 13 E., MDM dated 1859	9
M-4	Township Plat for T. 28 S., R. 13 E., MDM dated 1880	10
M-5	San Luis Obispo County Assessor's Map for T. 28 S., R. 13 E., MDM	11
M-6	Topographic Map Showing Property Ownership, Union Asphalt Incorporated Operatioo and Other Features	12
M-7	Geologic Map of Atascadero Area	14
M-8	Rocky Canyon Mining and Reclamation Plan, Phase 2	20
M-9	Rocky Canyon Mining and Reclamation Plan, Phase 3	21
M-10	Rocky Canyon Mining and Reclamation Plan, Phase 4	22
M-11	Rocky Canyon Mining and Reclamation Plan, Phase 5	23
M-12	Rocky Canyon Mining and Reclamation Plan, Phase 6	24
M-13	Rocky Canyon Mining and Reclamation Plan, Phase 7	24
M-14	Rocky Canyon Mining and Reclamation Plan, Phase 8	26
M-15	Rocky Canyon Mining and Reclamation Plan, Ultimate Conditions	27
M-16	Rocky Canyon Mining and Reclamation Plan, Cross Sections	28

Figures

F-1	Plot Plan UAI, Rocky Canyon Plant	30
F-2	Diagram of Visual Barrier, Rocky Canyon Quarry	34

Tablea

T-1	Description of Drill Cuttings	17
T-2	Estimated Volume and Tons to be Mined, BLM Parcel	19
T-3	Plant and Other Equipment Used for the Union Asphalt, Inc. Operation	30
T-4	General Data, Union Asphalt, Inc.'a Operation	34
T-5	Discounted Cash Flow (DCF) Analyais	43
T-6	Projected Yearly Production from Rocky Canyon BLM Parcel	44
T-7	F.O.B. Price List (Nov., 1991) Union Asphalt Inc.'a Current Operation	45
T-8	Operating Costs	46
T-9	Nondepreciable Capital Costs for Exploration, Development, and Environmental Considerations	49
T-10	In-field Crusher Depreciable Capital Costa	50
T-11	Other Depreciable Capital Costs and Accelerated Cost Recovery Schedule (ACRS)	51
T-12	Discount Rate Factors at a 10% Real (No Inflation) and Escalatioo Factors for Sale Prices and Operating Coats Per Ton	52

Platea

P-1	Photographs A through E Showing Existing and Proposed Mining Operations of Union Asphalt, Inc.	16
P-2	Photographs A througb H Showing Union Asphalt Inc., Plant	31

ATTACHMENTS

A-1	Expanded initial study-Hermreck Development Plan, June 20, 1988	26 pp.
A-2	San Luis Obaipo County Laod Use Permit, February 26, 1987	1 p.
A-3	San Luis Obispo Planning Commission Resolution No. 88-88, October 13, 1988	18 pp.

SUMMARY AND APPRAISED VALUE

Our purpose is to arrive at a fair market value (FMV) for exchange of an 80-acre Bureau of Land Management (BLM) parcel in S. 19, T. 28 S., R. 13 E., MDM, about 1½ airline miles SE of Atascadero, San Luis Obispo County, California. The parcel is landlocked with private ownership on all four sides.

Union Asphalt, Inc. (UAI), subsidiary of Hermreck-Willco Assoc. (HWA) has a County-permitted crushed rock operation under lease on the west side of the BLM parcel in Rocky Canyon. HWA is the real proponent of this exchange.

The parcel is mountainous with elevations from about 1,000 feet to 1,700 feet above M.S.L., and is on the west front of the La Panza Range. It is underlain by granitic rocks with about 6 inches to 2 feet of soil.

Drilling and testing show that the parcel contains about 33,500,000 tons of rock reserves suitable for aggregates. The reserve figure reflects mining to a proposed plan that will be submitted to San Luis Obispo County for permitting.

As of the date of this report we consider the highest and best use for the BLM parcel to be for mineral development through a rock quarry. Because of this determination we proceeded to our mineral appraisal. We used a discounted cash flow (DCF) analysis based on economic viability of a rock quarry operation run by UAI, and how much the mineral reserves are presently worth under given legal, technical, economic, and market conditions. Used were projected future annually escalated and depreciable capital costs with a real 10 percent discount rate over 20 project life years (PLY) in order to determine the after tax net present value (NPV). The NPV value was for consideration of 9,430,000 tons of rock reserves risked at 25 percent over the 20 PLY.

On January 24, 1992, we find the FMV of the rock reserves on the 80-acre BLM parcel to be $478,000.

CERTIFICATION BY MINERAL APPRAISER

I hereby certify, to the best of my knowledge and belief:

1. the statements of fact contained in this report are true and complete. No known facts or opinions have been omitted which would materially affect the value estimate.

2. I have no present or intended future interest in the property appraised and have no personal interest or bias respecting the parties involved.

3. I did not receive any compensation that was contingent on the analysis, opinions or conclusions contained in this mineral appraisal report.

4. the reported analyses, opinions, and conclusions are limited only by the stated assumptions and limiting conditions and represent my personal findings based on unbiased professional analysis, opinions and conclusions.

5. this appraisal has been made in accordance with recognized and accepted appraisal practices and conforms with appropriate laws and regulations.

6. this report was prepared by the undersigned who are solely responsible for the analyses, opinion and conclusions.

7. that I have made a thorough personal inspection of the mineral property and operation that is the subject of this report.

8. that the property operator, a designated representative, or other parties of direct interest have been given opportunity to accompany me on a joint inspection of the property appraised

Jim Evans
Mineral Appraiser

Gregg Wilkerson
Mineral Appraiser

Purpose and Scope of Report

The purpose of this report is to arrive at a fair market value (FMV) of the mineral estate in an arms-length transaction (ALT) for the 80-acre BLM parcel in question.

The definition of FMV is taken from Uniform Appraisal Standards for Federal Land Acquisitions, 1973 and is as follows:

> The amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property (mineral estate) would be sold by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desired but is not obligated to buy.

According to Black's Law Dictionary (5th edition, 1979), an ALT is:

> ...said of a transaction negotiated by unrelated parties, each acting in his or her own self interest, the basis for a fair market value determination.

or,

> The standard under which unrelated parties, each acting in his or her own best interest, would carry out a particular transaction.

To carry out the purpose of the report, investigations were made into the land status and record data, geological relationships, mining and processing techniques and production records of UAI, and reclamation and environmental considerations. Assembled information was integrated into an economic evaluation and an appraisal of FMV.

GENERAL ASSUMPTIONS AND LIMITING CONDITIONS

1. It is assumed that title to the mineral estate is marketable, and that there are not extraordinary or hidden conditions or encumbrances that would affect the value of the property.

2. Certain information, data estimates and opinions were supplied by others during the course of this investigation. While material was verified insofar as possible it cannot be guaranteed.

3. The conclusions in this report are to be used only under the stated "Purpose and Scope of Report" and in the time period of evaluation.

4. This report addresses only mineral estate Fair Market Value (FMV).

5. No hazardous materials or substances were observed on the property. While the appraiser has no knowledge of the presence or absence of such substances or materials, he has no special qualifications for detection or identification of such materials. This FMV is based on the assumption that no such materials are present that would cause a loss in value.

6. It is assumed that the future mineral operation of Union Asphalt, Inc. will be permitted by San Luis Obispo County and that the operation will comply with all reclamation and environmental constraints, and required health and safety requirements.

MINERAL APPRAISAL

General Assumptions

Our mineral appraisal of the BLM 80-acre parcel by the DCF income approach to value is with the following assumptions:

- HWA (proponent of exchange) is doing business through it's wholly owned subsidiary UAI with a crushed rock operation and quarry for aggregates adjacent on the west of the BLM parcel in Rocky Canyon.
- The crushed rock operation is on property owned by Dallaire and under lease to HWA to UAI.
- The BLM parcel is land locked by private property.
- HWA has a mineral right to the exclusion of any others and it is not feasible that any others will obtain a lease right in the foreseeable future from Dallaire.
- This appraisal will be made in consideration of the proponents mineral operation with the concept that the sale is to them and not on the open market, and that they are qualified and capable to continue on with a crushed rock operation.
- The economic evaluation will consider the posture of the mineral operation at present (date of appraisal).
- That more than sufficient reserves exist for the time period of evaluation.
- That to meet mine plan requirement UAI will have to mine from Dallaire's property contemporaneously with mining from the BLM parcel starting in project life year 12 (2004).
- That some needed additional permits to mine on the BLM parcel (assuming exchange takes place) will be obtained, and any needed environmental and reclamation mitigation will be accomplished.
- That the projected production rate over time is reasonable.
- That UAI will obtain needed permits, acquire the BLM property and begin production in the second project life year. This assumption is here made even through the HMA - Dallaire lease apparently requires four more years of production from Dallaire's property.
- That a plant processing fee will be charged by Dallaire for every ton of rock from the BLM parcel that is put through UAI processing plant on his property.
- There is no room, nor is it feasible because of the mine plan, lease terms, and topography to place the processing plant on the BLM parcel after ownership transfers.
- That the UAI operation will result in production in 1994 after 2 years time for environmental studies, and permitting.

Table T-10 Mineral Report Table of Contents Format
(Royalty Rate Determination and Lease Agreement)

Royalty Rate and Lease Agreement Determination Between Teichert Aggregates and The Bureau Of Reclamation For the Cool Cave Valley Mining Operation, El Dorado County, California

BY

James R. Evans, RG 431, CEG 958, CME 0007,
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Division of Energy and Minerals,
Bureau of Land Management, State Office
Sacramento, California

J. R. Evans
SIGNATURE

April 1, 2002
DATE

CONTENTS

	PAGE
SIGNED CERTIFICATION	1
CONCLUSIONS	2
RECOMMENDATIONS	3
PURPOSE	4
ASSUMPTIONS AND CONDITIONS	4
BRIF HISTORY OF MINING	5
GENERAL INFORMATION AND CURRENT HISTORY	6
PRIOR PERMITS AND LEASE	7
LEGAL DESCRIPTION OF TA PROPERTY AND BOR TRACKS 1 AND 2	9
ZONING AND LAND USE	10
GENERAL GEOLOGY	11
SITE GEOLOGY	11
VOLUME DETERMINATIONS OF BLOCKS TO BE MINED ON BOR TRACT 1	12
MINING AND PROCESSING	16
MARKET, USE, AND SPECIFICATIONS OF SALES PRODUCTS	19
ENVIRONMENTAL CONSIDERATIONS	20
RECLAMATION PLAN AND FINANCIAL ASSURANCE	20
ROYALTY RATE AND LEASE AGREEMENT	30
SELECTED REFERENCES	32

MAPS

M-1	INDEX MAP
M-1A	SURVEY MAP SHOWING BOR TRACTS 1 AND 2
M-2	EL DORADO CO. PARCEL/OWNERSHIP MAP
M-3	EL DORADO CO. ZONING MAP

M-4 EL DORADO CO. LAND USE MAP

M-5 AIR PHOTO MAP SHOWING TEICHERT AGGREGATES QUARRY AND FACILITIES (NORTH)

M-6 AIR PHOTO MAP SHOWING TEICHERT AGGREGATES QUARRY AND FACILITIES (SOUTH)

M-7 GEOLOGIC MAP SHOWING 1998 TEST DRILL HOLES AND CROSS SECTION LOCATIONS A-A" THROUGH E-E"

M-8 TOPOGRAPHIC MAP SHOWING PROPOSED DEVELOPMENT, PRODUCTION, AND RECLAMATION AREAS

M-9 TOPOGRAPHIC MAPS SHOWING EXISTING (1998) WORKINGS AND PROPOSED CONTOURING AFTER RECLAMATION

CROSS SECTIONS *(FROM MAP M-7)*

CS-1 A-A' (EXISTING-1998)
CS-2 A-A' (AFTER RECLAMATION)
CS-3 B-B' (EXISTING-1998)
CS-4 B-B' (AFTER RECLAMATION)
CS-5 C-C' (EXISTING-1998)
CS-6 C-C' (AFTER RECLAMATION)
CS-7 D-D' (EXISTING-1998)
CS-8 D-D' (AFTER RECLAMATION)
CS-9 E-E' (EXISTING-1998)
CS-10 E-E' (AFTER RECLAMATION)
CS-11 TYPICAL CROSS SECTION THROUGH TRACT 2

LETTERS

LT-1 LEASE PROPOSAL TO BOR FROM TEICHERT AGGREGATES, 10-4-01, 2p.
LT-2 BOR REQUEST FOR APPRAISAL UPDATE, 12-04-01, 1p.

LEGAL DOCUMENTS

LD-1 SUBMISSION OF NEW RECLAMATION BOND, 9-5-01, 10p.
LD-2 SUBMISSION OF NEW RECLAMATION BOND, 9-7-01, 2p.
LD-3 CATIGORICAL EXCLUSION CHECKLIST, 1999, 3p.
LD-4 STATE MINING AND GEOLOGY RD. RELEASE OF EL DORADO CO. FROM RESPONSIBILITY UNDER SMARA

PHOTOGRAPHS

P-1 INTRANCE GATE TO MINING OPERATION
P-1A ENTRANCE AREA TO MINING OPERATION
P-2 MINING IN THE SOUTH PIT
P-2A SOUTH END OF SOUTH PIT
P-3 UPPER PART OF MAIN PIT
P-3A MAIN PIT SHOWING LIMESTONE WALLS
P-4 GLORY HOLE SHOWING PART OF TRACT 1
P-5 MAIN PIT SHOWING TRACTS 1 AND 2
P-6 WEST WALL OF NORTHERN MAIN PIT
P-7 MAIN AND WASH PLANT AREA
P-8 CAT 5 1/2 yd^3 WHEEL LOADER
P-9 RIP RAP PLANT
P-10 MAIN AND WASH PLANT, AND AGGREGATE BASE PLANT

FIGURES

F-1 PRESPLIT AND PRODUCTION DRILL HOLE PATTERNS
F-2 MAIN AND WASH PLANTS- PROCESS-FLOW DIAGRAM
F-3 AGGREGATE BASE PLANT-PROCESS-FLOW DIAGRAM
F-4 DEISTER RIP RAP SORTER-PROCESS-FLOW DIAGRAM
F-5 RIP RAP PLANT-PROCESS-FLOW DIAGRAM

TABLES

T-1 F.O.B. PRICE LIST FOR TEICHERT AGGREGATES
T-2 FINANCIAL ASSURANCE ESTIMATE WORKSHEET

ATTACHMENTS

A-1 SMARA ANNUAL MINE INSPECTION COOL CAVE QUARRY, 11-28-01, 21p..
A-2 AMSTAR 1978 PERMIT TO DEPOSIT MATERIAL UPON GOVERNMENT LAND, 3P.
A-3 LEASE/PERMIT BETWEEN BOR AND AMSTAR-1984, 11P.
A-4 PERMIT FOR BOR TO SPRECKELS FOR DRILLING TEST HOLES ON TRACT 1, 5p.
A-5 MAPS, CROSS SECTIONS, FIGURES, AND VOLUME CALCULATIONS FOR THE SOUTH PIT-(FROM THE COOL CAVE QUARRY RECLAMATION PLAN, 12-9-99, VOL.1, AND APPENDIX C), p.

PURPOSE

The purpose of this report is to determine a reasonable royalty rate under a lease agreement between the Mid Pacific Regional Office of the Bureau of Reclamation (BOR)-Folsom, CA, and Teichert aggregates (TA) –2601 Hwy 49, Cool, CA 95614 (CA ID#91-09-0005) for Tracks 1 and 2 at the Cool Cave mining operation, El Dorado County California.

CONCLUSIONS

Teichert Aggregates (TA) is currently operating the Cool Cave Valley limestone quarry in El Dorado County, California. TA purchased the operation and affiliated private property from Limestone Products Company (Spreckels) in 2001. Part of the operation will be on Tracts 1 and 2 (about 10 acres) administered by the Bureau of Reclamation (BOR).

The BOR mining and reclamation work will be done concurrently with TA's normal operations under a long term approved reclamation plan approved for Spreckels, but accepted by TA. The plan will be administered by the State of California (Department of Conservation-DC) under the State Mining and Reclamation Act (SMARA). A security bond of $1,050,000 has been posted to the DC by TA, of which $450,000 is for the BOR lease work.

Most Of Tract 1 has been previously disturbed by mining and/or stripping of overburden and is currently not reclaimed. TA is proposing to extract about 224,000 yd³ of limestone left by previous operations down to the present Glory Hole level (1000' elevation) and reclaim newly disturbed ground. Work on Tract 2 will entail shaping, grading and benching of previously disturbed land, no mineral production will occur. This reclamation work is essential for safety and environmental factors outlined in the Reclamation Plan and to Mine adjacent limestone on TA property.

The Cool Cave Valley operation has supplied several markets with industrial calcium carbonate (mainly rock for sugar beet refining) and aggregates for over a century. However, the TA operation will supply only a variety of aggregates for their own, and others use in western Placer and El Dorado Counties. TA hopes to sell from about 250,000 to 300,000 tons of concrete aggregate and processed sands, aggregate bases, seal coat aggregates, and miscellaneous processed aggregates annually.

RECOMMENDATIONS

It is here recommended that BOR extend TA a 10-year lease under certain condition. These are:

1) All lease conditions will not start until both TA and BOR have signed the agreement.

2) A ten-year term is acceptable without any up-front priveledge payments.

3) All reclamation work on tracts 1, and 2 must be complete by the end of the ten-year lease agreement.

4) At least each year TA must provide the BOR with copies of periodic surveys and photomaps showing cubic yards removed and new topography.

5) Royalty payments will be based on cubic yards mined and reclamation obligations.

6) Royalty payments will be made annually in 10 equal payments on a mutually acceptable date.

7) If mining operations should cease, or a default occurs for any other reason than force majeure, TA will still be obligated to pay the amount due for the 10-year period.

Finally, it is here recommended that TA pay the BOR (based on a 80¢ / yd³ factor) $17,000 a year and $170,000 for the 10 year period, with the above 7 considerations built into the lease agreement.

ASSUMPTIONS AND CONDITIONS

Certain maps and documents in this report have been taken from reports by Evans and Springer, (1998 and 2000), and from the August 9, 1999 Reclamation Plan (4 vols.) submitted to El Dorado County Planning Department, and approved by them December 9, 1999. Material taken from the mine and Reclamation Plan has been examined and presumed to be accurate. Also, maps and data requested and directed by Evans from TA staff were verified and deemed acceptable.

The following is a list of assumptions and conditions:

1. TA now owns land purchased from Spreckels Limestone Products on 9/17/01, and operates the mining operation adjacent to Tracts 1, and 2 of BOR administered land near Cool, El Dorado County, California.

2. TA accepted conditions specified in the 1999 Reclamation Plan made for Spreckels.

3. The County of El Dorado will not administer the Reclamation Plan, but rather the State of California (Dept. Conservation), under the State Mining and Reclamation Act (SMARA).

4. TA will need a lease agreement with BOR in order mine and reclaim land under Tracts 1 and 2. The mining operation will be terminated within 10 years starting with the date of the lease agreement.

5. To meet approved mine plan requirements (between TA and SMARA), TA will have to partly mine and shape slopes from its own property contemporaneously with land under Tracts 1 and 2.

6. On Tracts 1 and 2 volumes of rock to be sold, overburden, and fill have been determined.

7. The projected rate of production and sales prices of aggregates over time presented by TA are reasonable.

8. The project is not located within the 100 year flood plain of the American River. Although there are culverts within one mile of the site on Highway 49, the operations are in an enclosed pit which does not impinge upon the American River or discharge water to Highway 49.

9. TA has obtained all required permits, and will comply with safety, health, and environmental conditions stipulated in the Mine and Reclamation Plan. Financial assurance for performance has been posted to the State of California in the form of a Security Bond by TA for $1,050,000 (see LD-1, and 2).

10. The State of California (Dept. Conservation) will properly perform, or have performed, annual inspections and financial assurance reviews for performance stipulated in the Mine and Reclamation Plan.

11. No hazardous materials were observed or known to exist on private or BQR administered land, and this report is based on the assumption that no such material are present.

- Confidential data is removed from the report and sent by separate cover. Remember, a report must stand alone, and a summary of confidential data may have to be made.

- Overall, the report attends to the items given under the headings- Report Checks, and Goals and Standards.

Technical Review and Editing

The terms "review" and "edit" are often applied loosely and interchangeably, but really each has a distinct connotation. By established usage, to review a manuscript is to critically evaluate its subject matter and basic organization, whereas the editing of a manuscript, is a later step and consists of correction of grammar and formatting details. First responsibility of the reviewer is to evaluate, but the reviewer should feel free to comment upon grammatical points. The extent to which experienced and objective reviewers should concern themselves with grammar depends on several factors including 1) the responsibility to help the author improve in writing ability and skills, 2) the extent to which grammatical vagueness clouds the data and conclusions, and 3) the ease with which these notations can be made without distracting the reviewer from his major purpose. In other words, a reviewer is not required to thoroughly edit for grammar, but is expected to make the grammatical notations necessary for desirable technical clarity.

Technical Reviewer/Appraiser Relationship

Technical Reviewers should make helpful, constructive, and appropriate comments with a positive attitude. Remember, the reviewer can be in the role of instructor, and it is part of the role of the reviewer to see that an author becomes a better writer. To this end, the reviewer and the author will benefit by informal discussions before, during, and after the review process.

Review Techniques

General

Reviewers should provide a written evaluation with general and specific commentary for corrective measures.

Process

Reviewers should first carefully read the entire report to gain a proper perspective. Next, the reviewer should focus on specific areas of concern. Comments should be thorough in extent, clear in explanation and prepared in a positive, appropriate manner. Avoid such comments as "really (?)," "awkward," "not clear," "explain," "expand", "evidence", and so forth because they may lead the author to frustration and resentment. Moreover, these words do not provide any explanation for corrective measures. Comments and suggestions should be written on a copy of the report. An overall summary and explanation of any major deficiencies should be prepared in narrative form on separate pages, hand written if clearly done. Comments and narrative should be sent to the author through appropriate channels. If possible, the reviewer and the author should then come together to discuss matters and their resolutions. If this is not possible, then the author and reviewer must communicate through correspondence and by phone.

Specific Instructions

Specific instructions for review of mineral appraisal reports for exchange are given at 43 CFR 2201.3-4.

2201.3-4 Appraisal review:

(a) Appraisal reports shall be reviewed by a qualified review appraiser meeting the qualifications set forth in 2201.3-1 of this part. (See below) Statements of value prepared by agency appraisers are not subject to this review.

(b) The review appraiser shall determine whether the appraisal report:

(1) Is complete, logical, consistent, and supported by a market analysis;
(2) Complies with the standards prescribed in 2201.3-3 of this part; and
(3) Reasonably estimates the probable market value of the lands appraised.

(c) The review appraiser shall prepare a written review report, containing at a minimum:

(1) A description of the review process used;

(2) An explanation of the adequacy, relevance, and reasonableness of the date and methods used by the appraiser to estimate value;
(3) The reviewing appraiser's statement of conclusions regarding the appraiser's estimate of market value; and
(4) A certification by the review appraiser to the following:
(i) The review appraiser has no present or prospective interest in the property that is the subject of the review report;
(ii) (ii) The review appraiser has not, and will not, receive compensation that was contingent on the approval of the appraisal report.

2201.3-1 Appraiser qualifications

(a) A qualified appraiser(s) shall provide to the authorized officer appraisals estimating the market value of Federal and non-Federal properties involved in an exchange. A qualified appraiser may be an employee or a contractor to the Federal or non-Federal exchange parties. At a minimum, a qualified appraiser shall be an individual, approved by the authorized officer, who is competent, reputable, impartial, and has training and experience in appraising property similar to the property involved in appraisal assignment.
(b) Qualified appraisers shall possess qualifications consistent with State regulatory requirements that meet the intent of title X1 of the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) (12 U.S.C. 3331). In the event a State does not have approved policies, practices, and procedures regulating the activities of appraisers, the Bureau of Land Management may establish appraisal qualification standards commensurate with those adopted by other States meeting the requirements of FIRREA.

RESOLUTION OF DISPUTES REGARDING MV

If a difference of opinion arises over the MV appraisal of a mineral interest, usually the mineral deposit value, three main options are available for the resolution of that difference.

1) Submission of the disputed appraisal(s) to another qualified appraiser for review;

2) Request for additional appraisals;

3) Involvement of an impartial third party to facilitate resolution of the value disputes; or

For federal exchanges guidance for bargaining and/or arbitration are given at 43 CFR 2201.4. In summary it is stated that any agreement based upon bargaining shall be in writing and made part of the administrative record of the exchange. Such agreement shall contain a reference to all relevant appraisal information and state how the parties reconciled or compromised appraisal information to arrive at an agreement based on market value.

E FACTORS FOR APPRAISAL PRACTICE

E-1. We save time, no matter how long it takes!
E-2. We save money, no matter how much it costs!
E-3. We will do qualified work, no matter what the qualification of the appraiser!
E-4. We never have time or money to do an appraisal report right, but we always have time and money to do it over and over and over again!
E-5. We have what it takes to take what you have!
E-6. We as a group can make mistakes, but no individual is ever wrong.
E-7. We have doubts so we talk convincingly; we get in trouble we delegate!
E-8. We do it the hard way, because it is always easier!

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ATTACHMENTS A-1 AND A-2

Attachment A-1

GUIDELINE FOR EXAMINATION OF AGGREGATE OPERATIONS
By J. R. Evans, 1994

I. GENERAL DATA

A. Name of Mining Firm, Deposit and/or Plant

B. Location

C. Company Management Staff and/or Field Staff Names

D. Investigator

E. Date of Field and/or Office Visit

F. Sources of Data

II. OWNERSHIP DATA

A. Private or Government Land

1. Ownership of Land
2. Amount of Land
3. How Long Held
4. Maps Showing Location With Legal Descriptions

B. Leased Land

1. Ownership
2. Amount of Land Leased
3. How Long Held
4. Map Showing Location With Legal Descriptions
5. Royalty Payment Situation

a. To Whom
b. For How Long
c. Rate Per Ton, or Yard, or % Gross
d. Up-front Payments Total $ Per Year Paid, and Total $ Paid To Date

III. HISTORY OF OPERATION, PRODUCTION, AND MARKETING DATA

A. Date of First Extraction, Mining, or Processing

1. Operations; Continuous, Discontinuous, Since Inception
2. Reasons for Discontinuations

B. Production

1. Total Production by Year
2. By Product Sold

a. Concrete Aggregates
b. Asphaltic Concrete Aggregates
c. Base Materials
d. Riprap
e. Railroad Ballast
f. Soil Cement
g. Fill
h. Other

3. Rate of Yearly Production

a. Present Rate
b. Average Past 5 and 10 Year Periods
c. Maximum Possible Production
d. Years of Deposit Life Left Based on Present Rate of Extraction and 5 and 10 Year Rates of Extraction

C. Pitside (f.o.b.) Prices per Ton for Each Material Sold

D. Imports-Exports Across County or State Lines

1. Amount

a. Type of Material
b. From Where to Where
c. For How Long
d. Costs

E. Transportation

1. Types Used: Truck, Rail, Barge, or Combination of
2. Company vs. Contract Hauling
3. Costs per Ton Mile for Haulage

a. PUC Rates if Applicable

1) Production Areas and Numbers
2) Delivery Zones and Numbers

4. Miscellaneous Related Transforation Costs Such as Loading and Unloading

F. Location, Ownership, of Concrete Batch and Asphaltic Batch Plants that Use Materials from this Operation

IV. GEOLOGY AND QUALITY CONTROL

A. Geological Formation, Member, or Unit

1. Name
2. Age/Fossils, and so forth
3. Areal Distribution
4. Type Area, Section, or Locality

B. Type of Deposit

1. Origin (Except for Slags, and Ashes)

a. Floodplain, Alluvial Fan, Steam Channel, Steam Terrace, Talus, Dredge Tailings, Mine Tailings, Bedrock, Marine Terrace, Glacial, Beach, Offshore Marine, Sand Dune

2. Conditions of Deposits
3. Source Areas
4. Shape of Basin of Deposition
5. Paths of Material Into Basins of Deposition

C. Geohazards

1. Earthquakes
2. Ground Motion
3. Active Fault Zone
4. Slope Failure
5. Flood Probability

D. Topographic Expression

1. Type of Topographic Expression

a. Hills, Bluffs, Rolling, etc.

2. Relief, and Natural Slope Angle
3. Drainage, Topo and Style
4. Quality and Amount of Exposure of Outcrops
5. Weathering Features
6. Erosion Features
7. Vegetation Type and Amount

E. Geological Contact Relations

1. Relation to Adjacent Rock Units

a. Deposited, Intrusive, Extrusive

2. Nature and Type of Geological Contacts

a. Faulted, Alteration Zones, Grain Size at Margins of Contact Zone, Assimilation, Stoping, Brecciation, Evidence of Forceful Injection

3. Facies Changes

F. Bulk Properties

1. Type of Bedding; Massive, Thick, Thin, and So Forth
2. Overall Attitude and Variations in Attitude of Bedding
3. Weathering, Mineral and Rock Alteration, Presence of Other Rocks not Useable
4. Thickness of Deposit, Length and Variations in General Shape; Stock, Dike, Wedge, Lense, Veins, and So Forth
5. Structural Features; Differentiation, Faulted, Folded, and So Forth
6. Smaller Scale Structures

    a. Primary -- such as Stratification, Cross-Bedding, Ripple Marks, Scour, Flow, Foliation, Linear, Layered, Massive, and So Forth
    b. Secondary -- such as Fissility, Fractures, Joints, Cleavage, Concretions, Modules, Disrupted Bedding, Slump, Clastic Dykes, Veinlets, Gouge Zones, and So Forth
    c. Describe Form, Color, Dimension, Development, Distribution, Orientation, Boundary Conditions, Style, Attitude, Shape, Spacing, Regularity, Relative Ages

7. Porosity (Estimated or Actual Percent Pore Space)
8. Permeability -- High, Intermediate, Low
9. Specify Gravity
10. Weight per Cubic Foot and Yard; Average, Variations in

G. Petrology

1. Color, and Distribution of Color

    a. Fresh and Weathered Surfaces
    b. Processed Product
    c. Give Color Index if Igneous or Metamorphic Rock (Percent of Dark Minerals)

2. Induration

    a. How Well Indurated
    b. Cementing Agent
    c. Desirable Joint and/or Cleavage Pattern and Relation to Rock Breakage on Blasting

3. Texture

    a. Grading (Grain Size, Average and Range) -- use Wentworth, and or Commercial Scales
    b. Sorting

        1) Amount of Volume of Coarse Fraction -- Pebble, Cobble, and Boulder
        2) Amount by Volume of Fine Fraction -- Granule and Smaller, Specify Clay Fraction
        3) Ratio of Coarse to Fine Fraction (+4 Mesh/-4 Mesh)
        4) Very Well, Well, Moderately, Poorly, or Very Poorly Sorted

    c. Sphericity of Fragments (Disk, Spherical, Bladed, Roller)
    d. Roundness of Fragments (Very Angular, Angular, Subangular, Subrounded, Rounded, Well Rounded)
    e. Surface Luster and Relief of Fragments
    f. For Intrusive, Metamorphic, and Volcanic Rocks Give Simple Textural Names, Rely on Description of Outcrops or Faces -- Vesicular, Amygdaloidal, Graphic Inclusions, Pyroclasic, Cataclastic, Mylonitic, Schistocity, Gneissic, and So Forth

4. Composition

a. Minerals, Types and Amount

1) Grain Size; Average and Range
2) Grain Shape; Equant, Tabular, Pismatic, Lath-like Irregular, Rod or Needle-like, Asbestosform, Micaceous, and So Forth
3) Grain Zoning or Inclusions

b. Rocks, Types and Amount
c. Bulk Rock Chemistry, and/or Mineral Chemistry
d. Organic Matter and/or Encrustations
e. Alteration Products of Minerals/Rocks
f. Rock Classification

H. Quality Control for Processed Material

1. Aggregate Test Results

a) Mechanical Analysis
b) Los Angeles Abrasion
c) Petrographic Analysis
d) Specific Gravity and Absorption of Coarse and Fine Materials
e) Unit Weight
f) Sand Equivalent
g) Durability
h) Cleanness
i) Soundness
j) Percent Crushed Particles
k) Organic Impurities
l) Compaction
m) Alkali Reactivity
n) Chemical Composition
o) Mineral Composition (Presence of "Asbestos", Particularly)

2. Reactive Rocks or Materials

3. Specifications Required for Processed Material: By Whom

V. RESERVES AND RESOURCES

A. Tonnage and How Determined; Separate In-the-ground, from Recoverable, give Tonnage Under Plant Site Separately -- Give Tonnage Factor and How Determined; Use Maps and Sketches -- Show Methodology Clearly, Plus All Data

1. Property Lines with Plots of Extraction Areas
2. Setbacks
3. Pit Slope Requirements
4. Maximum Pit Depth Permitted
5. Present Pit or Extraction Area Configuration, plus Projected Configuration at End of Extraction
6. Nature Pit Bottom
7. Position and Variation in Ground Water Surface
8. Amount of Overburden, Average Thickness, and Variation in (stripping ratio)
9. Percent of Waste during Mining and After Stripping
10. Amount of Waste Remaining, and How Distributed

VI. EXTRACTION AND PROCESSING

A. Extraction Methodology and Character of Extraction Areas

1. Type of Mining Operation
2. Equipment Used in Mining
3. Blasting Techniques
4. Describe Extraction Area, Present and Ultimate Size
5. Stripping Ratio (Tons/Tons)

B. Processing Plant

1. Flow Sheets
2. Rated Capacity
3. Days and Hours of Operation
4. Production Costs, and Cost per Ton of Material
5. Original Capital Costs

C. Describe Concrete Batch Plants and Asphaltic Concrete Batch Plants

D. Roads (In and Out)

E. Access to Freeways or Railroads, or Rivers

VII. LAND AND WATER USE

A. Zoning Restriction and Code Numbers (Attach to Report)

B. Land Use Permits, Bonds, and Code Numbers (Attach to Report)

C. Mine Reclamation Plans, and Costs of Related Problems

1. Ultimate Uses of Reclaimed Land

a) Appropriate Maps and Sketches

D. Stripping Wastes and Tailings Disposal

1. Amount
2. Where
3. Storage
4. Compacted or Loose
5. Problems Related To

E. Water Use

1. Source; Location
2. Amount
3. Costs

F. Waste Water Disposal

1. Settling Basins

a) Number
b) Size
c) Amount of Water Reused

2. Other Methods of Waste Water Disposal

a. Amount
b. Manner
c. Type

3. Waste Water Discharge Requirements (Attach to Report)

VIII. Environmental Considerations

A. Noise and Vibration Control

B. Air Pollution Control

C. Dust Control

E. Setbacks

F. Fencing

G. Hour of Legal Operation

H. Insurance

I. Main Highways or Freeways Used

J. In and Out Roads and Traffic Safety

K. Off Street Parking

L. Signs Posted

M. Beautification

1. Appearance
2. Screening Effect

N. Other

IX. HEALTH AND SAFETY REGULATIONS

A. Discuss any Special Problems at the Plants or Extraction Area

X. SPECIFIC ECONOMIC DATA (SEE GUIDELINES TEXT FOR DETAILED INFORMATION NEEDED)

A. Employee Totals

1. Mining and Processing
2. Supervision and Administration
3. Total Annual Payroll

B. Taxes Paid

1. County
2. City
3. State
4. Federal

C. Place in Local Economy

D. Current Assessed Valuation of Buildings and Equipment and Land

XI. CONCLUSIONS AND RECOMMENDATIONS

XII. REFERENCES

XIII. ATTACHMENTS

A. Maps

B. Flowsheets

C. Photographs

D. Tables

E. Published Articles

XIV. GENERAL LAND USE AND ECONOMIC DATA

A. Maps Showing Areas Zoned for Aggregate Extraction

B. Requirements for Zoning and Safety Ordinances for County, City, State and Federal

C. Brief History of Zoning and Permit Problems

D. Population Figures 1980 to Present and Projected to 2000; also Population Growth Rate (by County or City)

E. Total Value of Building Permits, Engineering Construction, and Total Construction 1980 to Present in Current Dollar Values

F. Area Growth Maps

G. Other Significant Information

Attachment A-2

01 March 1999

A GUIDE FOR REPORTING EXPLORATION INFORMATION, MINERAL RESOURCES, AND MINERAL RESERVES

SUBMITTED BY:

THE RESOURCES AND RESERVES COMMITTEE

TO

THE BOARD OF DIRECTORS

OF

THE SOCIETY FOR MINING, METALLURGY AND EXPLORATION, INC.

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Foreword

1. In 1988, at the request of members of the Society for Mining, Metallurgy, and Exploration (SME), Inc., the President of SME formed Working Party #79, Ore Reserve Definition, with the mission to develop guidelines for the public reporting of exploration information, resources, and reserves. A Subcommittee was appointed by the Working Party to draft these guidelines and submit recommendations to SME. The Subcommittee's recommendations were published by SME in the April 1991 issue of "Mining Engineering", and as a document entitled "A Guide for Reporting Exploration Information, Resources, and Reserves" in January 1992. Work continued on an ad-hoc basis until 1996, when Working Party #79 was renamed the SME Committee on Resources and Reserves and became a standing committee.

   Since 1994, the Council of Mining and Metallurgical Institutions (CMMI) has been working to create a set of international definitions for reporting mineral resources and mineral reserves. An ad-hoc International Definitions Group was formed, with representatives from mining and metallurgical institutions from the United States (SME), Australia (AusIMM), Canada (CIM), the United Kingdom (IMM) and South Africa (SAIMM). A major breakthrough came on October 18, 1997 when the CMMI International Definitions Group met in Denver, Colorado and reached a provisional agreement (the Denver Accord) on definitions of mineral resources and mineral reserves. Concurrently, and since 1992, the United Nations Economic Commission for Europe (UN-ECE) has been developing an international framework classification for mineral resources and mineral reserves. A joint meeting was held in Geneva on October 4, 1998 between the CMMI International Definitions Group and the UN-ECE Task Force. Agreement was reached to incorporate the CMMI standard reporting definitions for mineral resources and reserves into the UN framework classification, thus giving truly international status to the CMMI definitions.

2. The 1999 updated version of the SME Guide takes into account the October 1998 agreement reached in Geneva to develop an internationally accepted set of definitions and reporting standards. This has resulted in changes to the wording of the originally published definitions, but has not changed the meaning of the definitions or the intent of the Guide. The opportunity has also been taken to respond to many constructive suggestions received since the original publication of the Guide in April 1991.

   The main changes can be summarized as follows:

   - introduction of the concept and definition of "Competent Person";
   - adjustments to the definitions of "Mineral Resource", "Measured Mineral Resource", "Indicated Mineral Resource", "Inferred Mineral Resource", "Mineral Reserve", "Proved Mineral Reserve" and "Probable Mineral Reserve" to reflect the agreement reached between organizations participating in the CMMI initiative; the adjustments do not change the basis of the definitions; and
   - recognition that in certain situations, Measured Mineral Resources could convert to Probable Mineral Reserves rather than to Proved Mineral Reserves, because of uncertainties associated with modifying factors which are taken into account in the conversion from Mineral Resources to Mineral Reserves.

3. The Guide has been adopted by the Society for Mining, Metallurgy, and Exploration, Inc. and is therefore strongly recommended to be used by members of this organization.

4. The United States Securities and Exchange Commission (U.S. SEC) regulates the reporting of exploration information, resources and reserves by organizations, individuals or companies ("entities") subject to the filing and reporting requirements of the U.S. SEC. Decisions as to when and what information should be publicly reported are the sole responsibility of the entity owning the information, and are subject to U.S. SEC rules and regulations. These rules and regulations vary from time to time, and at any given time may not be consistent with the content of this Guide. At the time this Guide was prepared, the U.S. SEC did not allow the use of the terms "Mineral Resource". The advice of securities counsel should be sought in

preparing filings for the U.S. SEC or other securities regulatory authorities, and in preparing other public disclosures.

5. The Guide is recommended as a minimum standard for reporting exploration information, Mineral Resources and Mineral Reserves for public and private purposes. In terms of the Guide, a public report is a report on exploration information, Mineral Resources or Mineral Reserves, prepared for the purpose of informing the general public.

Public reports include, but are not limited to: company Annual Reports, quarterly reports, press releases and other reports. It is recommended that the Guide apply to the following reports if they have been prepared or are likely to be used for informing the general public: information memoranda, expert reports and technical papers reporting on exploration information, Mineral Resources or Mineral Reserves.

6. Public companies should provide all relevant and material information, necessary for an intelligent layman to make a reasonable and balanced assessment of the exploration information, Mineral Resource or Mineral Reserve being reported.

While every effort has been made within the Guide to cover most situations likely to be encountered in the reporting of exploration information, Mineral Resources and Mineral Reserves, there will inevitably be occasions when doubt exists as to the appropriate procedure to follow. In such cases, users of the Guide and those compiling reports under the Guide should be guided by its intent, which is to provide a minimum standard for reporting and to ensure that such reporting contains all information which investors and their professional advisers would reasonably require, and reasonably expect to find in the report, for the purpose of making a reasoned and balanced judgement regarding the exploration information, Mineral Resource or Mineral Reserve reported.

Table 1, included at the end of the Guide, supplies an outline of items that should be considered when evaluating a project. The importance of each item will vary with the project and it is recognized that, for some projects, other items may be relevant which are not on the list. The Table should be considered a guide to facilitate a rational and orderly approach to evaluation. However, the need remains for exploration and mining professionals to make difficult decisions, such as the classification of material as a Mineral Resource or a Mineral Reserve. Decisions remain a matter of professional judgment based on knowledge, experience, and industry practices.

The relative importance of the items in Table 1 will vary with each project depending on the geological environment and technical constraints, as well as economic and legal conditions pertaining at the time of evaluation. When evaluating a project, the relative importance of each item should be weighed. All relevant information must be given careful consideration before deciding which information should be reported to the public.

Where a particular report addresses only some of the items in Table 1, the report should disclose its limited scope and should refer to other information required for a complete evaluation of the exploration information, Mineral Resource or Mineral Reserve being reported. While such limited scope reports are commonly prepared as part of the overall preparation of an evaluation, such reports may contain information warranting public disclosure independent of the results of other studies and the authors of such reports should be aware of their responsibilities with respect to public disclosure.

Public disclosure may be required of factors most likely to affect the accuracy of estimates made in the report. The authors of reports should both identify and evaluate these important factors within their reports.

For a variety of reasons, including the need for confidentiality, all data used to evaluate a project need not be made public. However, the public can reasonably assume that all necessary information is available to support public statements at the time they are made.

Demonstration of economic feasibility is not required before reporting exploration information or Mineral Resources. However, particular attention should be given to all relevant information that increases or decreases the chances that the project will result in economic exploitation. Demonstration of economic feasibility is required before reporting Mineral Reserves.

It is recognized that estimates of exploration information, Mineral Resources, and Mineral Reserves, being predictions of what will occur in the future based on imperfect knowledge of the present, are inherently forward-looking statements, and will be inaccurate to some degree. It is also recognized that different individuals analyzing the same data may arrive at somewhat differing interpretations and conclusions. The fact that a Mineral Reserve estimate is misclassified or proven inaccurate at a later date, when additional information becomes available or economic conditions have changed, does not necessarily mean that the estimate was made incompetently or fraudulently.

Statements concerning exploration information, Mineral Resources and Mineral Reserves must have a reasonable basis and be made in good faith.

7. It is recognized that further review of the Guide will be required from time to time. Constructive suggestions are solicited from all users of this Guide. Comments should be sent directly to the Resources and Reserves Committee, care of SME.

Competence and Responsibility

8. A public report concerning an entity's exploration information, Mineral Resources and/or Mineral Reserves is the responsibility of the entity acting through its governing board. Any such report must be based on, and fairly reflect, the content of a report prepared by a Competent Person (or Persons) as defined below.

   In reporting exploration information, Mineral Resources and/or Mineral Reserves in a public report, an entity may need to edit the report prepared by the Competent Person. Where such editing takes place, the entity should ask the Competent Person to give his/her consent in writing to the edited information in the form and context in which it appears in the public report.

9. Reports detailing Mineral Resource and Mineral Reserve estimates from which a public report on Mineral Resources and Mineral Reserves is prepared, must be prepared by or under the direction of, and signed by, a Competent Person or Persons.

10. A **'Competent Person'** is a person who is a member of a professional society for earth scientists or mineral engineers, or has other appropriate qualifications. The Competent Person must have a minimum of five years experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the Competent Person is estimating, or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessment and evaluation of Mineral Resources. If the Competent Person is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment, evaluation and economic analysis of Mineral Reserves.

The key qualifier in the definition of a Competent Person is the word 'relevant'. Determination of what constitutes relevant experience can be a difficult area and common sense has to be exercised. For example, in estimating vein gold mineralization, experience in a high-nugget, vein-type mineralization such as tin, uranium etc. will probably be relevant whereas experience in (say) massive-type deposits may not be. As a second example, to be considered competent in evaluating and reporting on placer or alluvial gold deposits, a person would need to have considerable (at least five years) experience in this type of mineralization, because of the characteristics of gold in alluvial systems, the particle sizing of the host sediment, and the low grades being quantified. Experience with placer deposits containing minerals other than gold may not necessarily provide appropriate relevant experience.

The key word relevant also means that it is not always necessary for a person to have five years experience in each and every type of deposit in order to act as a Competent Person if that person has relevant experience in other deposit types. For example, a person with (say) 20 years experience in Mineral Resource estimation in a variety of metalliferous hard-rock deposit types may not require five years specific experience in (say) porphyry copper deposits in order to act as a Competent Person. Relevant experience in the other deposit types would count towards the required experience in relation to porphyry copper deposits.

In addition to experience in the style of mineralization, a Competent Person reporting Mineral Resources must have sufficient experience in the sampling and assaying techniques relevant to the deposit under consideration to be aware of problems which could affect the reliability of the data. Knowledge of extraction and processing techniques applicable to that deposit type is also important.

As a general guide, persons being called upon to sign as a Competent Person should be clearly satisfied in their own minds that they could face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration. If doubt exists, the person should either seek concurring opinions from other colleagues or should decline to sign as a Competent Person.

Estimation of Mineral Resources may be a team effort (for example, involving one person or team collecting the data and another person or team preparing the Mineral Resource estimate), and estimation of Mineral Reserves is commonly a team effort involving a number of technical disciplines. The Competent Person (or Persons) who signs the report is responsible and accountable for the whole of the report under the Guide. However, it is recommended that, where there is a clear division of responsibilities within a team, each Competent Person accept responsibility for his or her particular contribution. For example, one Competent Person could accept responsibility for the collection of geological data, another for the Mineral Resource estimation process, another for the mineability study, and the project leader

could accept responsibility for the overall report. It is important that the Competent Person accepting overall responsibility for a Mineral Resource or Mineral Reserve report which has been prepared in whole or in part by others is satisfied that the work of the other contributors is acceptable to the Competent Person.

Rules, regulations or guidelines concerning the Competent Person differ from country to country. In the United States, the U.S. SEC does not currently require that a Competent Person sign a public report on exploration information, Mineral Resources or Mineral Reserves. In Australia, the Australian Stock Exchange Limited (ASX) requires that releases by entities which make statements about Mineral Resources or Mineral Reserves are based on information compiled by a Competent Person as defined by the Australasian Code for Reporting of Mineral Resources and Ore Reserves (The JORC Code). In Canada in 1998, the Mining Standards Task Force of the Toronto Stock Exchange and Ontario Securities Commission recommended that the concept of Qualified Person be incorporated formally into rules applicable to the publication of Mineral Resources and Mineral Reserves. In these and all other jurisdictions, it is the responsibility of the Competent Person and the entity making a public report to ensure that the appropriate rules, regulations and guidelines are followed.

Reporting Terminology

11. Public reports dealing with exploration information, Mineral Resources and/or Mineral Reserves must only use the terms set out in Figure 1.

Figure 1 – General Relationship between Exploration Information, Mineral Resources and Mineral Reserves

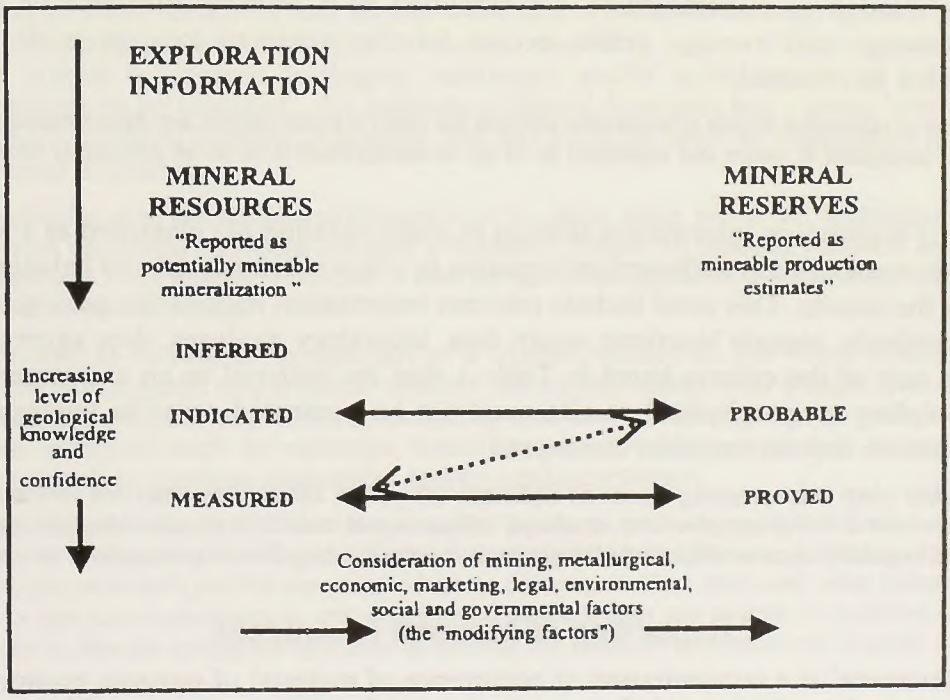


Figure 1 sets out the framework for classifying exploration information, tonnage and grade estimates and contained or recoverable minerals as applicable. This classification reflects different levels of geological confidence and different degrees of technical and economic evaluation. Mineral Resources can be estimated mainly on the basis of geoscientific information with some input from other disciplines. Mineral Reserves, which are a modified sub-set of the Indicated and Measured Mineral Resources, require consideration of those factors affecting extraction, including mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors, and should in most instances be estimated with input from a range of disciplines.

In certain situations, Measured Mineral Resources could convert to Probable Mineral Reserves rather than to Proved Mineral Reserves because of uncertainties associated with modifying factors which are taken into account in the conversion from Mineral Resources to Mineral Reserves. This relationship is shown by the broken arrow in Figure 1. In such situations these modifying factors should be fully explained.

In certain situations, previously reported Mineral Reserves could convert back to Mineral Resources because of new information according to which a Mineral Reserve can no longer be reported. The resulting two-way relationship is shown by the two-headed arrows in Figure 1. The modifying factors which resulted in reclassification of a Mineral Reserve should be fully explained.

Public Reporting – General

12. Reports concerning an entity's exploration information, Mineral Resources or Mineral Reserves should include a description of the style and nature of mineralization.

13. An entity must disclose relevant information concerning the status and characteristics of a mineral deposit which could materially influence the economic value of that deposit. To meet disclosure obligations, an entity may be required to promptly report any material changes in its Mineral Resources or Mineral Reserves.

14. Throughout the Guide, where appropriate, "quality" may be substituted for "grade" and "volume" may be substituted for "tonnage".

15. Units used for reporting Mineral Resources or Mineral Reserves should be those generally applicable within the industry and within the jurisdiction where reporting takes place, for the mineral being reported.

Reporting of Exploration Information

16. An entity may choose or be required to report exploration information. If an entity reports exploration information in relation to mineralization not classified as a Mineral Resource or a Mineral Reserve, estimates of tonnage and average grade, except for the weighted average grade of specified assay intervals, must not be reported.

> *Where descriptions of exploration targets or exploration potential are given in public reports, any figures mentioned must be clearly order-of-magnitude and conceptual in nature and expressed so as not to misrepresent them as an estimate of Mineral Resources or Mineral Reserves.*

17. Public reports of exploration information relating to mineralization not classified as a Mineral Resource or Mineral Reserve must contain sufficient information to allow a considered and balanced judgement of the significance of the results. This must include relevant information such as the geological setting, sampling intervals and methods, sample locations, assay data, laboratory analyses, data aggregation methods plus information on any of the criteria listed in Table 1 that are material to an assessment. The reporting of exploration sampling or geophysical results must not be presented so as to unreasonably imply that a potentially economic deposit has been discovered.

> *Table 1 is a checklist which those preparing reports on exploration information, Mineral Resources and Mineral Reserves should use as a reference. The checklist is not prescriptive and, as always, relevance and materiality are overriding principles which determine what information should be publicly reported. Reporting of isolated assays without placing them in perspective is unacceptable.*

Reporting of Mineral Resources

18. A **'Mineral Resource'** is a concentration or occurrence of material of intrinsic economic interest in or on the Earth's crust (a deposit) in such form and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource.

> *The term Mineral Resource covers deposits which have been identified and estimated through exploration and sampling and from which Mineral Reserves may be defined by the consideration and application of technical, economic, legal, environmental, social and governmental factors.*
>
> *The term reasonable prospects for eventual economic extraction implies a judgement (albeit preliminary) by the Competent Person in respect of the technical and economic factors likely to influence the prospect of economic extraction, including the approximate mining parameters. In other words, a Mineral Resource is not an inventory of all mineralization drilled or sampled, regardless of cut-off grade, likely mining dimensions, location or continuity. It is a realistic inventory of mineralization which, under assumed and justifiable technical and economic conditions, might become economically extractable.*

Where considered appropriate by the Competent Person, Mineral Resource estimates may include mining related assumptions which should be clearly stated.

19. An **'Inferred Mineral Resource'** is that part of a Mineral Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which is limited or of uncertain quality and/or reliability. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource.

The category is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling completed, but where the data are insufficient to allow the geological and/or grade continuity to be confidently interpreted. The assumptions made in evaluating an Inferred Mineral Resource must be reasonable, after considering all available information. Due to the uncertainty which may attach to some Inferred Mineral Resources, it cannot be assumed that all or part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Confidence in the estimate is not sufficient to allow the appropriate application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure. Caution should be exercised if this category is considered in economic studies.

20. An **'Indicated Mineral Resource'** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are too widely or inappropriately spaced to confirm geological continuity and/or grade continuity but are spaced closely enough for continuity to be assumed. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource, but has a higher level of confidence than that applying to an Inferred Mineral Resource.

A deposit may be classified as an Indicated Mineral Resource when the nature, quality, amount and distribution of data are such as to allow the Competent Person determining the Mineral Resource to confidently interpret the geological framework and to assume continuity of mineralization. Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters and to enable an evaluation of economic viability.

21. A **'Measured Mineral Resource'** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are spaced closely enough to confirm geological and/or grade continuity.

A deposit may be classified as a Measured Mineral Resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the Competent Person determining the Mineral Resource, that the tonnage and grade of the deposit can be estimated within close limits and that any variation from the estimate would not significantly affect potential economic viability. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit. Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters and to enable an evaluation of economic viability.

22. The choice of the appropriate category of Mineral Resource depends upon the quantity, distribution and quality of data available and the level of confidence that attaches to those data. The appropriate Mineral Resource category must be determined by the Competent Person.

Mineral Resource classification is a matter for skilled judgement and the Competent Person should take into account those items in Table 1 which relate to confidence in Mineral Resource estimation.

In deciding between Measured Mineral Resource and Indicated Mineral Resource, the Competent Person may find it useful to consider, in addition to the phrases relating to geological and grade continuity in Clauses 20 and 21, the phrase in the guideline to the definition for Measured Mineral Resource: .... any variation from the estimate would not significantly affect potential economic viability .

In deciding between Indicated Mineral Resource and Inferred Mineral Resource, the Competent Person may wish to take into account, in addition to the phrases relating to geological and grade continuity in Clauses 20 and 21, the guideline to the definition for Indicated Mineral Resource: Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters and to enable an evaluation of economic viability , which contrasts with the guideline to the definition for Inferred Mineral Resource: Confidence in the

estimate is not sufficient to allow the appropriate application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure. Caution should be exercised if this category is considered in economic studies .

23. Mineral Resource estimates are not precise calculations, being dependent on the interpretation of limited information on the location, shape and continuity of the occurrence and on the available sampling results. Reporting of tonnage and grade figures should reflect the order of accuracy of the estimate by rounding off to appropriately significant figures and by qualification with terms such as 'approximately'.

Depending on the accuracy of the estimate, rounding to the second or third significant figure should be sufficient. For example 10,863,425 tonnes at 8.23 per cent could be stated as 11 million tonnes at 8.2 percent or 10.9 million tonnes at 8.23 percent.

In order to emphasize the imprecise nature of a Mineral Resource or Mineral Reserve estimate, it is recommended that the final result always be referred to as an estimate not a calculation.

24. Mineral Resource reports must specify one or more of the categories of "Inferred", "Indicated" and "Measured". Reports must not contain Inferred Mineral Resource figures combined with either of the other two categories. The Measured and Indicated categories must be separately reported if this information is material. A Mineral Resource must not be reported in terms of contained metal content unless corresponding tonnage and grade figures are also presented. Mineral Resource figures must not be aggregated with Mineral Reserve figures.

25. Table 1 provides, in a summary form, a list of the main criteria which should be considered when preparing reports on exploration information, Mineral Resources and Mineral Reserves. These criteria need not be discussed in a public report unless they materially affect estimation or classification of the Mineral Resources.

It is not necessary, when publicly reporting, to comment on each item in Table 1, but it is essential to discuss any matters which might materially affect the reader s understanding or interpretation of the results or estimates being reported. This is particularly important where inadequate or uncertain data affect the reliability of, or confidence in, a statement of exploration information or an estimate of Mineral Resources and/or Mineral Reserves; for example, poor sample recovery, poor repeatability of assay or laboratory results, limited information on tonnage factors etc.

If there is doubt about what should be reported in order to ensure full disclosure, it is better to err on the side of providing too much information rather than too little.

Mineral Resource or Mineral Reserve estimates are sometimes reported after adjustment by cutting of high grades, the application of factors such as dilution, mine or mill call factors , and similar modifying factors. If any of the data are materially adjusted or modified for the purpose of making the estimate, this should be clearly stated in a public Mineral Resource or Mineral Reserve report and the nature of the adjustment or modification described.

26. The words 'ore' and 'reserves' must not be used in stating Mineral Resource estimates as the terms imply technical feasibility and economic viability and are only appropriate when all relevant technical, economic, legal, environmental, social and governmental factors have been considered. Reports and statements should continue to refer to the appropriate category or categories of Mineral Resources until technical feasibility and economic viability have been established. If re-evaluation indicates that the Mineral Reserves are no longer viable, the Mineral Reserves must be reclassified as Mineral Resources or removed from Mineral Resource/Mineral Reserve statements altogether.

It is not intended that re-classification from Mineral Reserves to Mineral Resources should be applied as a result of changes expected to be of a short term or temporary nature, or where management has made a deliberate decision to operate on a non-economic basis. Examples of such situations might be a commodity price drop expected to be of short duration, mine emergency of a non-permanent nature, transport strike etc.

Reporting of Mineral Reserves

27. A **'Mineral Reserve'** is the economically mineable part of a Measured or Indicated Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of

reporting that extraction is reasonably justified. Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proved Mineral Reserves.

Mineral Reserves are those portions of Mineral Resources which, after the application of all mining factors, result in an estimated tonnage and grade which, in the opinion of the Competent Person making the estimates, can be the basis of a viable project after taking account of all relevant metallurgical, economic, marketing, legal, environmental, social and governmental factors. Mineral Reserves are inclusive of diluting material which will be mined and delivered to the treatment plant or equivalent.

The term economic implies that extraction of the Mineral Reserve has been established or analytically demonstrated to be viable and justifiable under reasonable investment and market assumptions. The term Mineral Reserve need not necessarily signify that extraction facilities are in place or operative nor that all governmental approvals have been received. It does signify that there are reasonable expectations of timely approvals.

It should be noted that the Guide does not imply that an economic operation must have Proved Mineral Reserves. Situations arise where Probable Mineral Reserves alone may be sufficient to justify extraction, as for example with some alluvial tin or gold deposits. This is a matter for judgement by the Competent Person and the management of the entity owning the information.

The terms Ore Reserves and Mineral Reserves can be used interchangeably where it is customary to do so, usually for metallic deposits and some industrial minerals.

28. A **'Probable Mineral Reserve'** is the economically mineable part of an Indicated and, in some circumstances, Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified. A Probable Mineral Reserve has a lower level of confidence than a Proved Mineral Reserve.

29. A **'Proved Mineral Reserve'** is the economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified.

30. The choice of the appropriate category of Mineral Reserve is determined primarily by the classification of the corresponding Mineral Resource and must be made by the Competent Person.

The Guide provides for a direct relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proved Mineral Reserves. In other words, the level of geoscientific confidence for Probable Mineral Reserves is the same as that required for the determination of Indicated Mineral Resources and for Proved Reserves is the same as that required for the determination of Measured Mineral Resources.

The Guide provides for a two-way relationship between Measured Mineral Resources and Probable Mineral Reserves. This is to cover the situation where uncertainties associated with any of the modifying factors considered when converting Mineral Resources to Mineral Reserves may result in there being a lower degree of confidence in the Mineral Reserves than in the corresponding Mineral Resources.

If the uncertainties in the modifying factors that prevented the Measured Mineral Resource being converted to a Proved Mineral Reserve are removed, then the Measured Mineral Resource may be converted to a Proved Mineral Reserve. No amount of confidence in the modifying factors for conversion of a Mineral Resource into a Mineral Reserve can override the upper level of confidence which exists in the Mineral Resource. Under no circumstances can an Indicated Mineral Resource be converted to a Proved Mineral Reserve, unless new information first justifies conversion to a Measured Mineral Resource. Under no circumstances can an Inferred Mineral Resource be converted to a Mineral Reserve unless first converted to an Indicated or Measured Mineral Resource.

Application of the category of a Proved Mineral Reserve implies the highest degree of confidence in the estimate.

Refer also to Clause 22 regarding classification of Mineral Resources.

31. Mineral Reserve estimates are not precise calculations. Tonnage and grade figures in reports should be expressed so as to convey the order of accuracy of the estimates by rounding off to appropriately significant figures.

See Clause 23 regarding rounding of Mineral Resource estimates.

32. Mineral Reserve reports must specify one or both of the categories of 'Proved' and 'Probable'. Reports that combine Proved and Probable Mineral Reserve figures must provide estimates for each category if this information is material. Reports must not present contained metal figures unless corresponding tonnage and grade figures are also presented.

33. When reporting a Mineral Reserve, tonnages, grades and mineral or metal contents must be reported after taking into account mining loss and mining dilution. Mineral and metal contents can be reported after also taking into account processing recoveries. If processing recoveries are not taken into account, the percentage expected to be recovered or lost after processing must be reported.

34. In situations where figures for both Mineral Resources and Mineral Reserves are reported, a clarifying statement must be included in the report which clearly indicates that the Mineral Resources are additional to the Mineral Reserves.

An appropriate form of clarifying statement may be:

The Measured and Indicated Mineral Resources are additional to the Mineral Reserves.

It is strongly recommended that, if there is a significant difference between a Mineral Reserve and the Mineral Resource from which this Mineral Reserve was estimated, an explanation of the reasons for the difference should be included in the report. This will assist the reader of the report in making a judgement of the likelihood of the remaining Mineral Resources eventually being converted to Mineral Reserves.

When converting Mineral Resources to Mineral Reserves, Mineral Reserves may incorporate material (dilution) which may not have been included in the original Mineral Resource. This fundamental difference between Mineral Resources and Mineral Reserves should be explained if of material significance.

Remaining Mineral Resources must be reported separately from Mineral Reserves because the resulting total may be very misleading in economic terms and may be misunderstood or, more seriously, misused to give a false impression of the prospectivity of a project.

Public reporting of tonnage and grade estimates other than Mineral Resources and Mineral Reserves is not permitted under the Guide. Other estimates may be useful for an entity in its internal calculations and evaluation processes, but their inclusion in public reports could cause confusion.

In preparing the Mineral Reserve statement, the relevant Mineral Resource statement on which it is based should first be developed. This should be reconciled with the Mineral Resource statement estimated for the previous comparable period and differences (due, for example, to mine production, exploration, etc.) identified. The application of appropriate factors to the Mineral Resource can then be made to develop the Mineral Reserve statement which can also be reconciled with the previous comparable Mineral Resource statement. Mining companies are encouraged to reconcile estimates whenever possible in their reports. A detailed account of differences between Mineral Reserves and corresponding Mineral Resource figures is not essential, but sufficient comment should be made to enable significant variances to be understood by the reader.

35. Table 1 provides, in a summary form, a list of the main criteria which should be considered when preparing reports on exploration information, Mineral Resources and Mineral Reserves. These criteria need not be discussed in a public report unless they materially affect estimation or classification of the Mineral Reserves. In reporting Mineral Reserves, information on assumed metallurgical recovery factors is very important, and should be included in public statements. Changes in economic or political factors alone may be the basis for significant changes in Mineral Reserves and should be reported accordingly.

See guidelines to Clause 25 regarding references to Table 1.

Reporting of Mineralized Stope Fill, Stockpiles, Remnants, Pillars, Low-Grade Mineralization and Tailings

36. The Guide applies to the reporting of all potentially economic mineralized material including mineralized stope fill, stockpiles, remnants, pillars, low grade mineralization and tailings.

For the purposes of the Guide, mineralized stope fill and stockpiles of mineralized material can be considered to be similar to in situ mineralization when reporting Mineral Resources and Mineral Reserves. Consequently the Competent Person carrying out the assessment of the fill or stockpiles must use the bases of classification outlined in the Guide. In most cases, the opinion of a mining engineer should be sought when making judgements about the mineability of fill, remnants and pillars.

If there are not reasonable prospects for the economic extraction of a particular portion of the fill or stockpile, then this material cannot be classified as either Mineral Resources or Mineral Reserves. If some portion is currently sub-economic but there is a reasonable expectation that it will become economic, then this material may be classified as a Mineral Resource. Such stockpile material may include old dumps and tailings dam material. If technical and economic studies have demonstrated that economic extraction could reasonably be justified under realistically assumed conditions, then the material may be classified as a Mineral Reserve.

The above guidelines apply equally to low-grade in-situ mineralization, sometimes referred to colloquially as mineralized waste or marginal-grade material , and often intended for stockpiling and treatment towards the end of mine life. For clarity of understanding, it is recommended that tonnage and grade estimates of such material be itemized separately in public reports, although they may be aggregated with total Mineral Resource and Mineral Reserve figures.

Stockpiles are defined to include both surface and underground stockpiles, including broken ore in stopes, and can include ore currently in the ore storage system. Mineralized material in the course of being processed (including leaching), if reported and of material importance, should be reported separately together with the basis for estimation.

Mineralized remnants, shaft pillars and mining pillars which are potentially mineable are in situ mineralization and consequently are included in the Guide definitions of Mineral Resources and Mineral Reserves.

Mineralized remnants, shaft pillars and mining pillars which are not potentially mineable must not be included in Mineral Resource and Mineral Reserve statements.

United States Securities and Exchange Commission

37. The United States Securities and Exchange Commission (U.S. SEC) regulates the reporting of exploration information, resources and reserves, by entities subject to the filing and reporting requirements of the U.S. SEC. Decisions as to when and what information should be publicly reported are the sole responsibility of the entity owning the information, and are subject to U.S. SEC rules and regulations. These rules and regulations vary from time to time, and at any given time may not be consistent with the content of this Guide. At the time this Guide was prepared, the U.S. SEC did not allow the use of the term "Mineral Resource". The advice of securities counsel should be sought in preparing filings for the U.S. SEC or other securities regulatory authorities, and in preparing other public disclosures.

TABLE 1. Checklist of Assessment Criteria

Estimates of the value of mineral projects are expressions of judgment predicated on knowledge and experience. Such estimates are more than arbitrary determinations; they seek to attach value as a consequence of method. The methods employed must be scientifically valid, tested, using accepted scientific definitions of terms and accepted procedures, and best suited to the making of reliable estimates for the project in question. Evaluation of mineral projects requires periodic examination and evaluation of all new and existing data. The dynamic nature of the evaluation of mineral projects implies that a valid estimate made at a given time may be significantly changed when new information becomes available. Evaluation of a mineral project should consider all the criteria listed below and such additional criteria that may be viewed as significant. The relative importance of the criteria will vary with the particular project and the legal and economic conditions pertaining at the time of evaluation. When information is publicly reported, it must be sufficient to enable an intelligent layman to make a reasonable and balanced assessment of the significance of this information. When and whether information should be publicly released is subject to current laws and regulations in the relevant jurisdictions.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
A. General			
1. Purpose of report	Statement of person for whom the report was prepared, whether it was intended as a full or partial evaluation, what work was conducted, what work remains to be done.	See Exploration Information	See Exploration Information
2. Project Description	Description of commodity, magnitude of project, background, and business arrangement.	See Exploration Information	See Exploration Information
3. Project Location	Description of location (country, state or province, county, township and range, easting and northing, etc.); a map showing location and access should exist.	See Exploration Information	See Exploration Information
4. Property Ownership	Description of ownership of surface rights, mineral rights, access rights, leases, concessions, royalties, and other encumbrances and liabilities.	See Exploration Information	See Exploration Information.
B. Project Data			
1. Location of Project Data	Maps and cross sections or other two- or three-dimensional representation of information should exist, showing location of samples, drill holes, exploration pits, underground workings, geological data, etc. When evaluating drill hole information, consideration should be given to depth to top and bottom of mineralization, to total length and average grade of intercepts, and to the accuracy of survey information including downhole surveys.	See Exploration Information. Particular attention should be given to drill hole and other sample survey information including downhole surveys. If the sample locations are not well known, the effect on the resource estimates should be considered.	See Mineral Resource. The location of samples and other relevant features (property lines, mine workings, etc.) should be well-known. The location of drill hole collars should be accurate and the adequacy of the down-hole surveying technique should be reviewed and commented on.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
2. Geological Data	Description of the nature, detail, and reliability of geological information (rock types, structure, alterations, mineralizations, and relation to known mineralized zones, etc.). Description of geophysical and geochemical data. Reliable geological maps and cross sections should exist to support interpretations.	See Exploration Information. Particular attention should be given to drill hole logging and other sample information used in resource evaluation. Description of the thoroughness with which all significant lithologic, structural, mineralogical, alteration, or other geological or geotechnical characteristics were recorded. Significant data, or data that could materially influence the estimated quantity and quality of the resource, should be discussed.	See Mineral Resource
3. Sampling a. Method	Description of sample type and sample collection method (hand, grab, trench, channel, or chip sample; core hole, rotary hole, or reverse circulation; bulk sample, etc.). Discussion of sample quality and representativeness (sample recovery, high grading, selective losses or contamination, and any other factors that may have resulted in sample biases, etc.). Discussion of whether duplicate samples or alternative methods of sampling were used to verify sample quality. If indirect methods of measurement were used (geophysical methods), these should be described, with attention given to errors in interpretation.	See Exploration Information. The quantity and quality of sample information is critical to the reliability of resource estimates. Particular attention should be given to this information.	See Mineral Resource. Adequate sampling verification techniques, including appropriate numbers of duplicates and appropriate statistical analyses of duplicates are required.
b. Preparation	Description of laboratory and method used for sample preparation, subsampling and size reduction, and likelihood of inadequate or nonrepresentative samples (improper size reduction contamination, etc.). Discussion of whether tests were performed to verify the suitability of sample preparation.	See Exploration Information	See Exploration Information. Verification of the suitability of sample preparation is required.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
c. Analysis	Identification of laboratory and analytical method (fire assay, AA assay, emission spectroscopy, etc.). Discussion of precision and accuracy, including the use of check assays, quality control programs, and submission of samples to other laboratories for verification.	See Exploration Information	See Exploration Information. Verification of analytical techniques and quality control programs are required.
d. Specific Gravity and Bulk Tonnage	Generally not determined.	Discussion of how the tonnage factor was determined (assumed or measured). If assumed, which assumptions were made and on which basis. If measured, by what method and how frequently. Discussion of whether different tonnage factors were used in different parts of the deposit and why.	See Mineral Resource. The specific gravity and bulk tonnage must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.) and for differences between rock and alteration zones within the deposit.
C. Interpretation			
1. Geological Interpretation And Model	Description of geological model and inferences made from this model. Discussion of adequacy of data density and reliability, and whether the quality and quantity of information are sufficient to support statements made or inferred concerning potential for significant economic discovery.	See Exploration Information. Discussion of sufficiency of data density to assure continuity of mineralization and provide an adequate data base for the estimation procedure used. Discussion of the extent to which the interpretation is based on data or on assumptions and whether consideration was given to alternative interpretations or models.	See Mineral Resource.
2. Numerical Model	Generally not determined.	Detailed description of the method used and the assumptions made to estimate tonnages and grades (section, polygon, inverse distance, geostatistical, or other method). Description of how the geological interpretation was used to control the resource estimates. Discussion of basis for using or not using grade cutting or capping.	See Mineral Resource.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
2. Numerical Model (Continued)	Generally not determined.	If a computer method was chosen, description of programs and parameters used. Geostatistical methods are extremely varied and should be described in detail. The method chosen should be justified. The geostatistical parameters, including the variogram, and their compatibility with the geological interpretation should be discussed. Experience gained in applying geostatistics to similar deposits should be taken into account.	See Mineral Resource.
D. Extraction			
1. Mining			
a. Method	Description of any obvious mining factors that could have a significant impact on the project feasibility.	Description of any mining factors that could have a significant impact on the project feasibility. Discussion of possible mining methods.	Description and justification of mining method(s) to be used. Discussion of mining rate, equipment selected, ore control methods, geotechnical and hydrological considerations, personnel requirements, dilution, and mine recovery. For open pit mines, discussion of pit slopes, slope stability, and strip ratio. For underground mines, discussion of mining method, rock mechanics considerations, mine design characteristics, and ventilation.
b. Costs	Generally not determined.	Stated reasonable assumptions.	Description and justification of capital and operating costs.
2. Processing			
a. Method	Description of any obvious processing factors that could have a significant impact on the project feasibility.	Description of any processing factors that could have a significant impact on the project feasibility. Discussion of possible processing methods.	Description and justification of processing method(s) to be used, equipment, plant capacity and personnel requirements. Justification of estimated recovery (proportion of material sent to the processing plant that will be recovered) whether based on historical information, laboratory test, or pilot plant results.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
b. Costs	Generally not determined.	Stated reasonable assumptions.	Description and justification of capital and operating costs.
3. Recovery a. Mining	Generally not determined.	Stated reasonable assumptions.	Reported tonnages, grades and mineral contents must take into account mining dilution and losses. Description and justification of mining dilution and losses is required.
b. Processing	Generally not determined.	Stated reasonable assumptions.	Discussion of whether the reported tonnages and grades consist of material in place or whether processing recoveries are included. If in-place values are reported, information must be supplied concerning expected processing losses or recoveries. Justification of processing recoveries is required.
4. Environmental Compliance and Reclamation	Description of obvious environmental factors likely to stop the project.	Description of any environmental factors that could have a significant impact on the project feasibility. Discussion of possible means of mitigation.	The necessary permits have been obtained, or there is reasonable basis to believe that all permits required for the project can be obtained in a timely manner. Description of environmental compliance methods and costs.
5. Cutoff Grade	Generally not determined.	Justification of the cutoff grade used to report resources.	Description of methods used to calculate cutoff grades.
E. Feasibility 1. Other Economic Considerations	Description of valuable and potentially valuable product(s) including suitability of products to market.	See Exploration Information. A resource represents material from which economic extraction of a product is currently or potentially feasible. Before reporting resources, consideration should be given to this definition.	Description of product to be sold. Discussion of whether there exists a ready market for the product, whether contracts for the sale of the product are in place or expected to be readily obtained. Justification of assumptions made concerning production cost and value of product. Transportation, marketing, and other costs should be considered.

Evaluation Criteria	Exploration Information	Mineral Resource	Mineral Reserve
2. Valuation Methods	Generally not applied.	Stated reasonable assumptions.	Detailed description of the method used to determine the economic feasibility of the project.
F. Assurance Classification	Data to support estimates with a sufficient degree of assurance is lacking. Specific quantities and grades cannot be reported.	Description and justification of criteria used to classify the resource. When reported, a resource should be classified as measured, indicated, or inferred. Depending on materiality measured and indicated resources may be combined and need not be reported separately. To classify a resource as measured or indicated, there must be a reasonably high level of confidence with respect to the quality of the information used to calculate this resource, as well as the interpretation of this information.	Description and justification of criteria used to classify the reserves. Reserves are classified as proven or probable to reflect relative degrees of geological assurance. Depending on materiality, proven and probable reserves may be combined. There should not be significant uncertainty concerning the economic viability of the project. Only measured and indicated resources can be considered for inclusion in the reserve. Resources classified as inferred lack the requisite degree of assurance to be included in the reserve.
G. Other Considerations	Description of any other significant information that is likely to prevent or facilitate the economic viability of the project. Identification of work or conditions required to demonstrate the presence of a resource or to evaluate this resource.	Description of any other material information that could prevent or facilitate the economic viability of the resource. Identification of work or conditions required to convert the resource to a reserve. A resource represents material that has the potential of being of economic value. No specific economic criteria need be assumed when evaluating a resource. However, known information that significantly reduces or increases the probability of economic feasibility should be reported.	While any other material information affecting the project should be discussed, no material impediments to the profitable exploitation of the property should remain. Material uncertainties about the geology, extraction, processing, marketing, and legal requirements have been eliminated. It is not required that all permits be issued or that mining and processing facilities have been constructed. However, there should be a reasonable basis to believe that permitting and construction of the necessary facilities can be accomplished in a timely manner.
H. Qualification of Estimator(s)	Name and qualification of the Competent Person(s) preparing and reviewing the foregoing	See Exploration Information	See Exploration Information

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